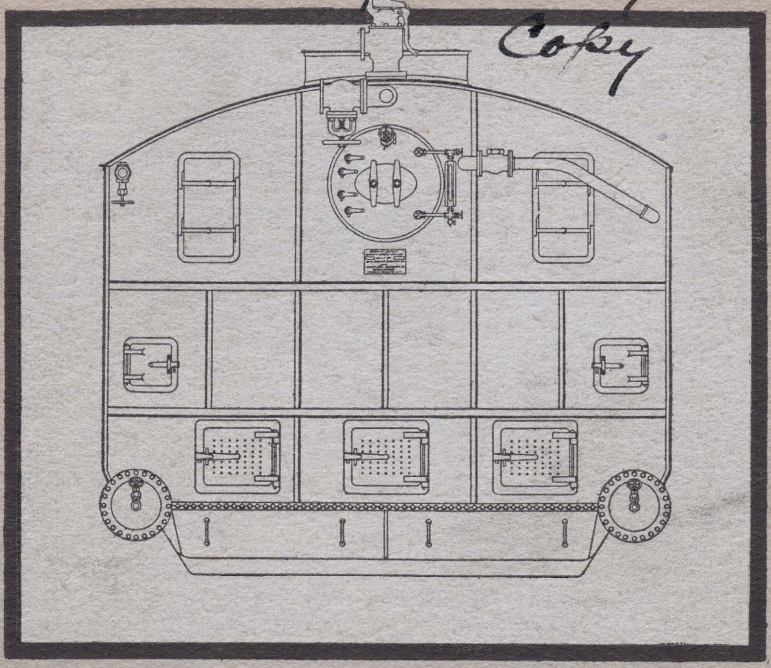
M.E. 101-2
50
Ref.
REFERENCE
Engineering Reading Room
C76555
Calculus Library
Copy



The SEABURY WATER TUBE BOILER

For STATIONARY and MARINE SERVICES

MANUFACTURED BY

GAS ENGINE & POWER CO.

AND

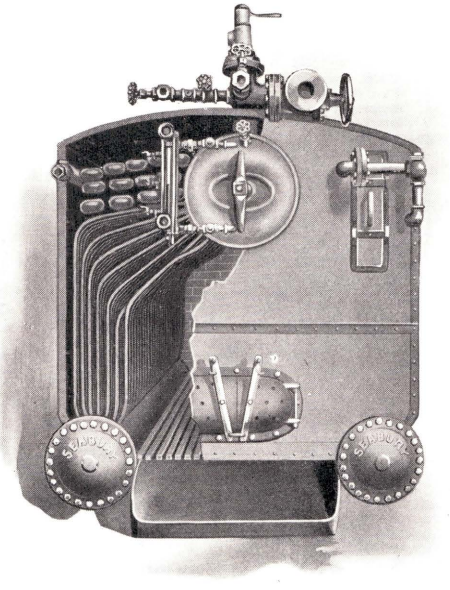
CHARLES L. SEABURY & CO.

CONSOLIDATED

MORRIS HEIGHTS NEW YORK CITY

SEABURY SAFETY WATER TUBE BOILERS

STATIONARY AND MARINE

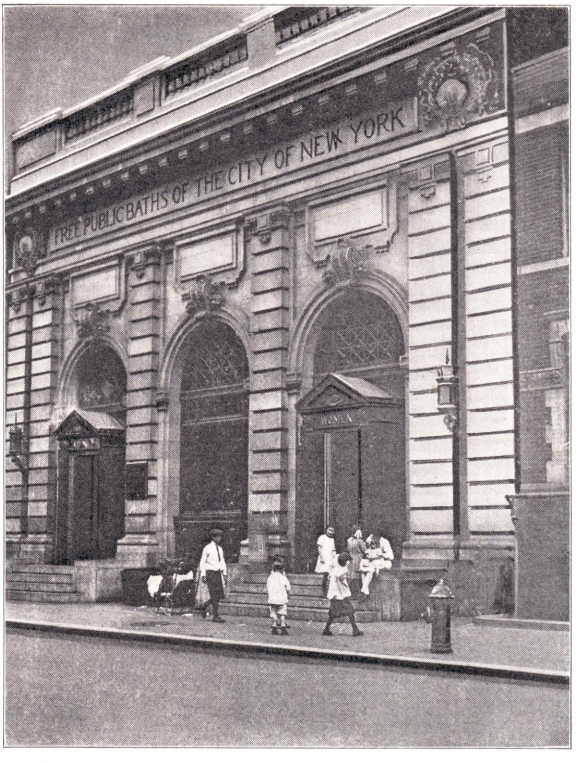


MANUFACTURED ONLY BY

GAS ENGINE & POWER CO. AND
CHARLES L. SEABURY & CO.
CONSOLIDATED

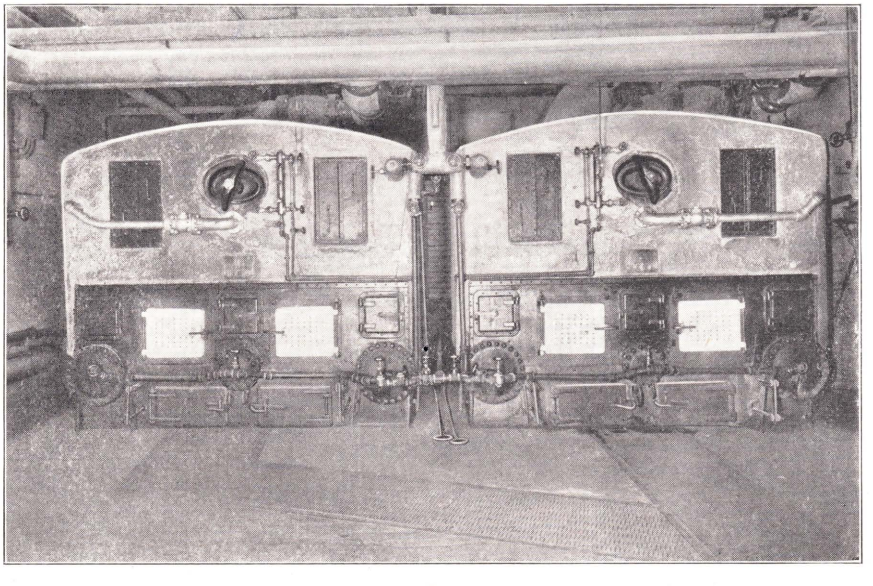
MORRIS HEIGHTS, NEW YORK CITY
(ON THE HARLEM)

CATALOG No. 10



FREE PUBLIC BATHS
OF THE
CITY OF NEW YORK

Two Seabury Safety Water Tube Boilers of special design erected in position in limited space as illustrated below.



INDEX

	PAGE
Introduction	5
The Design, Test Data, Sizes	7
Sizes, Fittings	9-11
Horse-Power, Workmanship and Facilities	13
Tests	13
Prices	13
Terms	13
Construction and Materials, Steam Drum, Mud Drums	15
Tubes	15
Furnace	15
Casing or Brick Setting	15
Combustion Chamber, Feed Water Heater	17
Grate Bars	17
Coal, Wood and Oil Fuels	19
Foundation and Support	19
Ash Pan or Ash Pit	19
Automatic Stokers	21
Circulation	23
Feed Water and Scale	25
Operation and Care	27
Laying Up	29
Where Seabury Boilers Are Built	33
Other Products	39
Inquiry Blank	47

Erie Railroad Lighter "Suffern." Seabury Hull and Special Boiler

THIS WAS BACK IN 1902—THE SAME BOILER IS STILL DOING THE SAME SATISFACTORY WORK

MISSION OF THE IMMACULATE VIRGIN
Lafayette Pl. and Great Jones St.
(P. O. Box 3512)

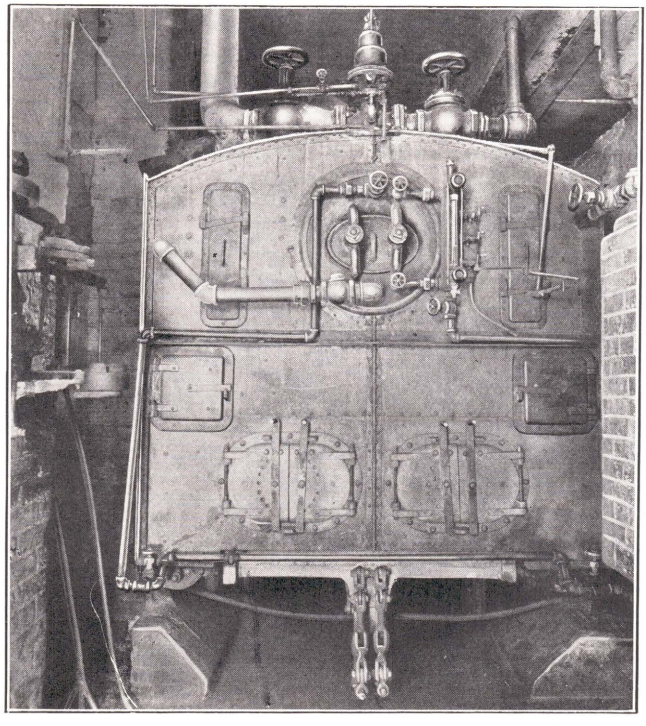
NEW YORK, June 9, 1902.

Gas Engine & Power Co.
Morris Heights, N. Y.

GENTLEMEN—In answer to your inquiry of June 2nd in reference to our experience with the SEABURY SAFETY BOILER, made by your Company, we beg to state, after one year's experience with it, that it has met all requirements and is satisfactory in every respect.

Moreover, we consider it to be one of the most economical as well as one of the easiest steaming boilers made.

Yours respectfully,
REV. J. J. DOUGHERTY, LL.D.,
Per J. Murphy, *Engineer.*



INTRODUCTION

In presenting this catalogue, descriptive of the SEABURY SAFETY WATER TUBE BOILER, it has been assumed that the architect or engineer, who may have occasion to refer to it, is already, by virtue of his position, familiar with the essential requisites of a boiler, so that it remains but to present to him the details of construction wherein the SEABURY boiler differs from others and wherein it performs its functions differently or to better advantage. The fact that it *does* so has already been well established.

The SEABURY SAFETY WATER TUBE BOILER has *for over twenty years* stood unsurpassed under various conditions of service, both stationary and marine, and the architect and engineer may rest assured of unexcelled performance under any conditions to which we ourselves would be willing to subject it. We therefore invite the engineering profession to consult us freely on any proposition requiring boiler installation. Modifications are sometimes made to meet particular conditions, as may be judged from the fact that SEABURY SAFETY WATER TUBE BOILERS are now in use for such varied purposes as heating public baths, under low pressure, and for driving the fastest yacht in the world, where a permissible steam pressure of 350 pounds was provided.

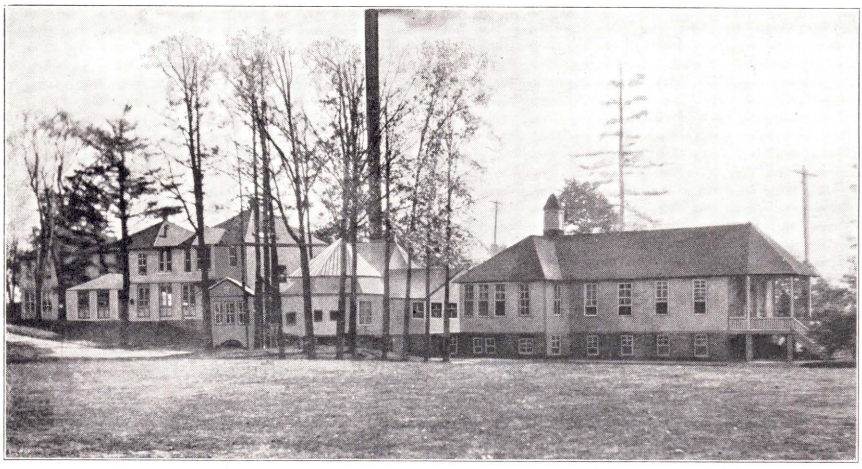
Our engineering staff is ready to co-operate in the production of power plants to meet any special requirements that may come within the scope of a water tube boiler of this class, either for stationary or marine work, to which end all communications should be addressed:

BOILER
DEPARTMENT

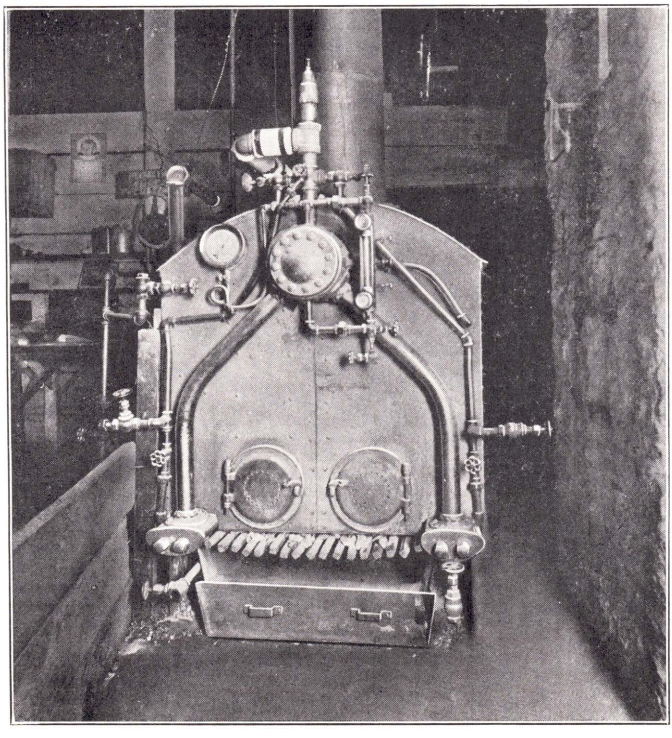
GAS ENGINE & POWER
CO. AND
CHARLES L. SEABURY
& CO.,
CONSOLIDATED

Morris Heights,
New York City

City of New York Municipal Tug "Manhattan"
Seabury Hull, Boiler and Engine



New York University Mechanical Engineering Testing Laboratories
and Special Seabury High-Pressure Safety Water Tube Boiler



THE SEABURY SAFETY WATER TUBE BOILER

THE DESIGN

The SEABURY SAFETY WATER TUBE BOILER is designed to meet the requirements of a light-weight boiler, occupying a *minimum of floor space* per horse-power, besides possessing, to the highest degree, all the essential qualities and attributes of safety. Its simplicity of construction must appeal to all fair-minded engineers, especially as this simplicity tends to materially increase efficiency and durability.

All the pressure elements throughout the SEABURY SAFETY WATER TUBE BOILER, whether of the stationary or marine type, are kept as small as is consistent with good designing, thus making it an exceptionally safe steam generator. By comparing the steam drum of a SEABURY boiler—its largest pressure element—with the large drums, many feet in diameter, in the shell and Scotch types of boilers, the claim of greater safety is at once apparent.

A large number of SEABURY boilers are to be found in both stationary and marine service. Boilers intended for stationary and commercial marine work, where weight is not an essential factor, are of heavy construction, with large steam drums and generating tubes. Steam domes are also added when required. High-speed yacht boilers are constructed with small drums and generating tubes, so as to economize in weight.

Standard SEABURY boilers are designed with a single steam drum connected to two lower or mud drums—one on each side—by two nests of bent tubes enclosing a large combustion chamber. The tubes are staggered so as to present the greatest amount of direct heating surface, and are also so arranged as to facilitate their cleaning by means of a steam jet and hose.

When given ordinary care renewal of tubes will not be necessary for many years, and then, when found necessary, a tube can be replaced in a very short time.

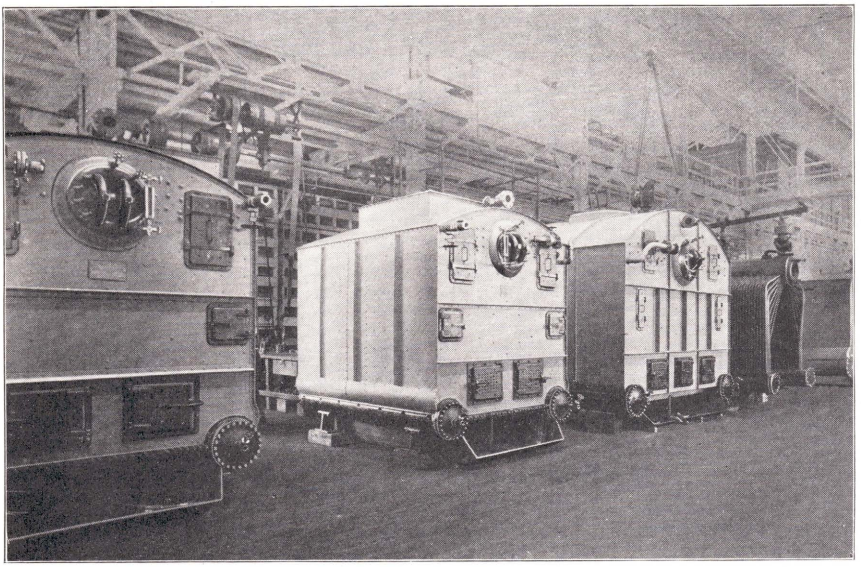
The two nests of tubes to the right and left of the combustion chamber, with their baffling walls, together with the feed water heater—when supplied—running crosswise over each nest of tubes, interpose an efficient heating surface from which the maximum amount of heat is extracted.

TEST DATA

We will furnish test data where required, from our records, of such tests as conform to the character of service which the contemplated boilers are to perform. It will readily be appreciated that the conditions of operation would greatly affect the result, so that we have adopted the policy of furnishing, upon request, test data from boilers performing service similar to that intended.

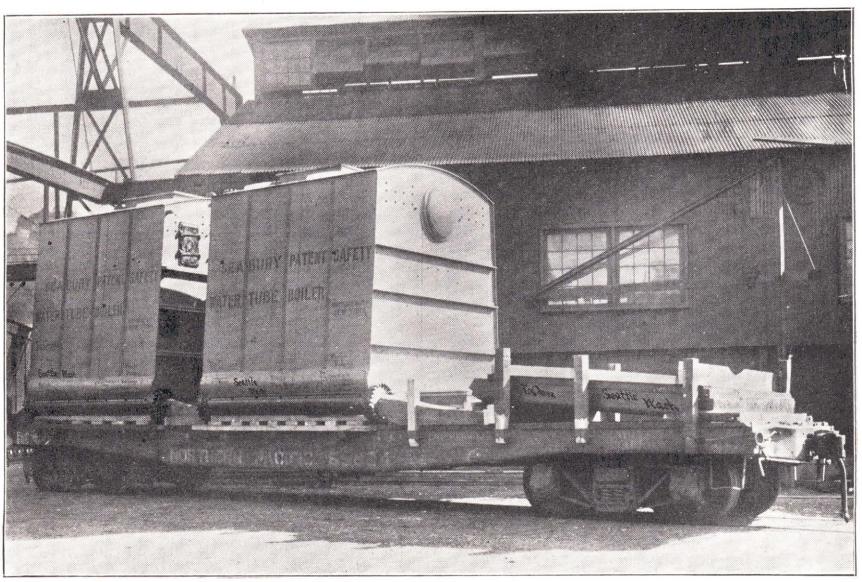
SIZES

SEABURY WATER TUBE BOILERS are built to any size from 3 to 3,000 horse-power, and either single or double-ended. They are of the most flexible design and can be constructed to fit the space available with the least amount of waste room. (See page 9.)



a *b* *c* *d* *e*

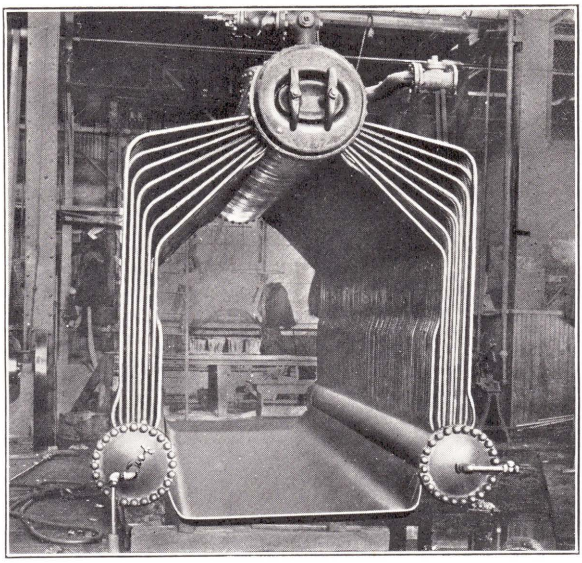
Erecting Floor, Boiler Shop. *a*, One of two boilers for yacht "Galatea"; *b*, Boiler for yacht "Sisilina"; *c*, Boiler for yacht "Aria"; *d*, Boiler for packet "Hatteras"; *e*, Boiler for U. S. Navy Yard, Mare Island, Cal.

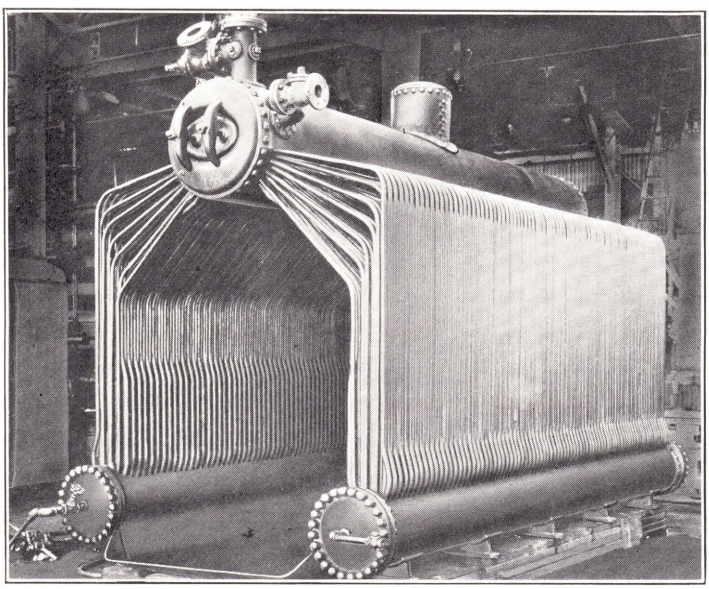


Seabury Water Tube Boilers on car for shipment to Seattle, Washington. Built to limit of dimensions for transcontinental shipment.

SIZES OF SEABURY BOILERS

Heating Surface	Grate Surface	Length Casing	Width Casing	Height Over All	Weight Lbs.
120	3.5	30	34	49	1,290
181	5	34½	35¾	46	1,300
222	4.9	43½	36	61¼	2,170
307	8.4	55	46	58	3,550
333	9.5	48	54	64	4,020
451	12.2	63½	57	69	5,700
475	12	62½	58¼	60	4,860
524	12.5	72	50½	72	5,925
572	12.6	60½	60	82	6,296
580	16.3	62½	69¾	74	6,400
584	14	72½	56	66	6,450
589	17.5	78½	58	75	7,500
592	16.8	59½	71¾	76	6,615
613	18.3	78½	58	78½	7,650
661	16.3	72	62	78	7,655
706	20	82	62	72	7,850
735	20.7	78	68	75	8,415
749	23.6	72	75	77	8,845
753	21	78	69	79	8,865
754	22.8	81	71	72	8,416
762	24	82	71	72	8,700
767	21.3	78	68	77	8,423
776	20	80½	68	77	8,536
780	22.8	76	72	82	8,750
784	22.4	73½	74	82	9,145
796	24.6	73½	76	82	8,756
868	23.5	88½	68	81½	9,548
900	27	68½	95½	90	10,465
910	24.8	64½	86½	84	10,600
925	28.9	68½	95½	100	10,800
940	21.3	75	72	102	11,000
948	28	94¾	72½	81	9,585
994	34.3	68½	95½	89	9,585
1,087	32.4	80¾	88¾	96	9,670
1,135	24.4	84	72	108	12,400





Seabury Safety Water Tube Boiler undergoing hydraulic test, of double the intended working steam pressure, before assembling heater and casing

SIZES OF SEABURY BOILERS—*Continued*

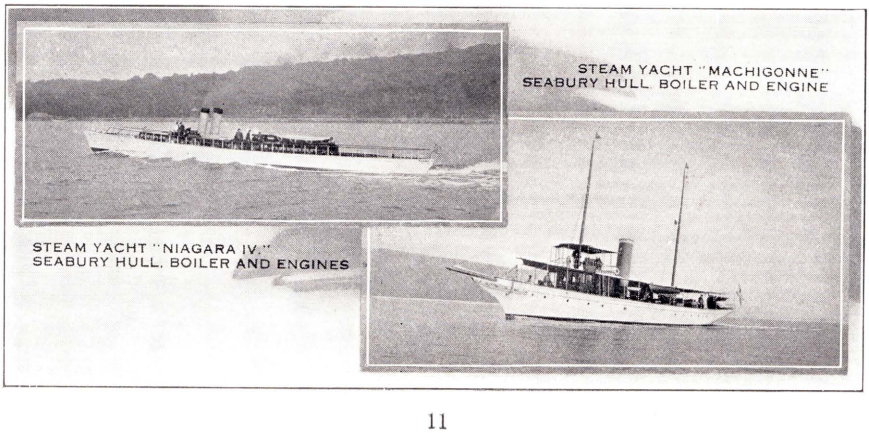
Heating Surface	Grate Surface	Length Casing	Width Casing	Height Over All	Weight Lbs.
1,250	39.3	90	96	90	13,560
1,310	41	91	98	100	14,100
1,312	39.3	90	96	101	15,300
1,425	43.3	125	72	78	12,970
1,522	43.5	96	97¾	98	16,644
1,755	49.3	100	104	100	19,509
1,921	50	106	100	110	24,456
1,949	42	108	87½	113	19,424
2,137	46.3	124	81	124	22,844
2,146	55	108	109	109½	23,000
2,850	80.7	119	135	131	29,145
3,055	61.8	108	123½	136	29,500

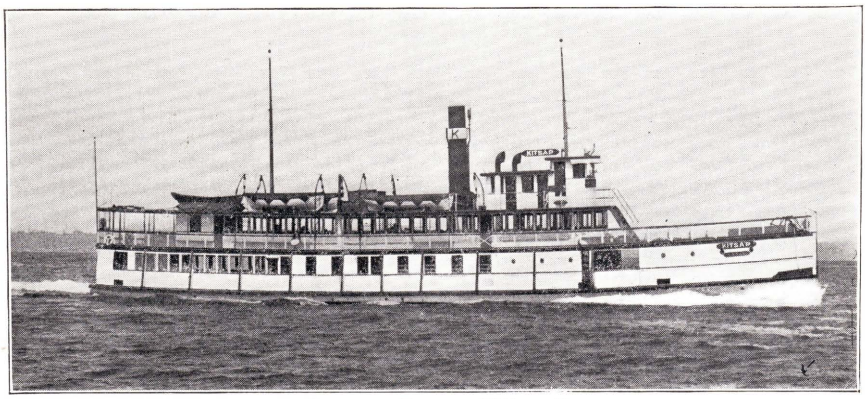
Note—These are some of the sizes which have been built and which we are prepared to duplicate. We have also other sizes not here listed and are prepared to build boilers to suit any specified space requirements, within reasonable limits.

FITTINGS

THE FOLLOWING FITTINGS ARE INCLUDED:

Water column complete
Three (3) water gauge cocks
One (1) soot burner blower
One (1) set of firing tools
Whistle connection
Safety valve
Two (2) blow-off cocks
One (1) grate shaker
Feed check valves
Connection for main steam and auxiliary steam





Passenger Steamer "Kitsap"

W. L. GAZZAM
PRESIDENT

C. G. COKER
TRAFFIC MANAGER

WHITE COLLAR LINE

STEAMERS "HYAK"
"KITSAP"
"BURTON"
"RELIANCE"

PIER 3

Kitsap County Transportation Company

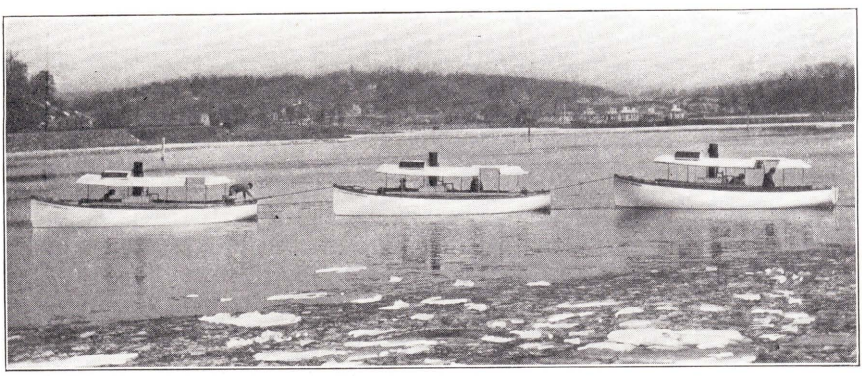
OF KITSAP COUNTY

SEATTLE, WASH., July 24, 1914.

Gas Engine & Power Co.,
Morris Heights, New York City.

GENTLEMEN—Your favor of the 13th inst. has my attention, and I beg to advise you that the Seabury engine and boiler outfits placed in the steamers "Hyak" and "Kitsap" have proved very satisfactory. As you are aware, the first cost of these engines and boilers was higher than that of other competing makes, but we believe that they were much cheaper in the long run, as our experience is that repairs on other makes have made Seabury engines and boilers much the cheapest. Very truly yours,

W. L. GAZZAM,
President.



Launches for U. S. Army Transports. Seabury Hulls, Boilers and Engines

HORSE-POWER

For commercial work, boiler horse-powers are based on the standard evaporation of 34.5 pounds of water per hour from and at 212° Fahrenheit.

For marine work, where close figuring is necessary, the horse-power of the boiler can be determined if the following data is furnished:

Type of engine—simple, compound, triple, etc.
Diameter of all cylinders.
Length of stroke.
Point of cut-off.
Steam pressure.
Number of revolutions per minute of engine.
Natural or forced draft.

Upon receipt of the above information—or as much thereof as possible—we will give dimensions of a boiler or boilers that will do the expected work and quote prices accordingly. (See page 47.)

WORKMANSHIP AND FACILITIES

The workmanship is of the very best and is uniform throughout, as we employ only competent and skilled mechanics. This, with special tools for the work, permits us to compete with any manufacturer on any proposition for which a first-class boiler of this type is desired.

TESTS

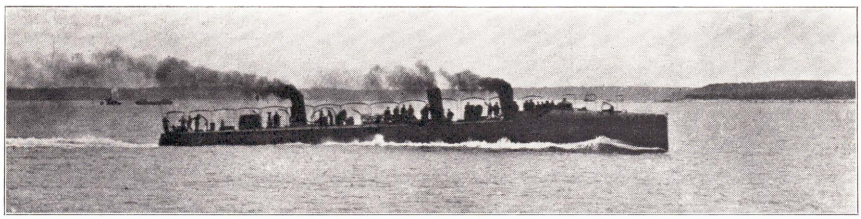
All SEABURY boilers, after completion, are subjected to a hydrostatic pressure of *double* the intended working pressure. Apart from this test the heaters and the generating tubes are subject to 1,000 pounds hydrostatic pressure before assembling.

PRICES

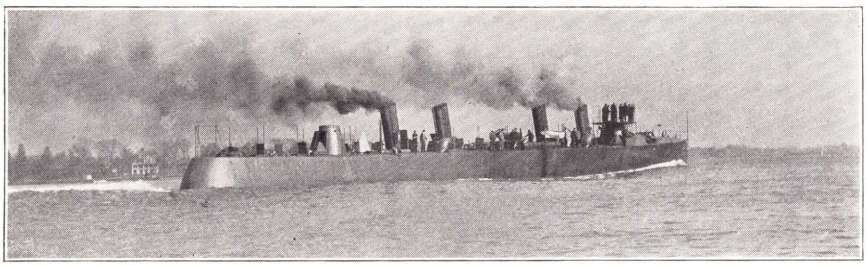
Owing to constant changes in the cost of labor and materials, we do not include price lists in our catalogue, as we desire to maintain as low a price as is consistent with a *first-class product.* Prices as low as possible will be quoted promptly upon receipt of the necessary information. (See page 47.)

TERMS

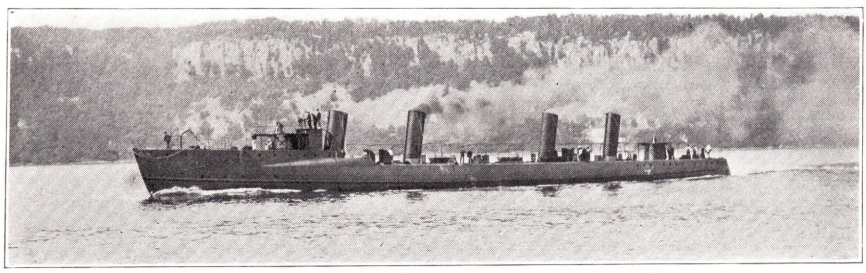
Our terms are 25 per cent. with the order and the balance when the boiler is tested *and ready for shipment.* These terms apply in all cases and are not altered or varied according to the financial standing of the purchaser. We believe this to be most satisfactory to both parties. Net cash, New York funds.



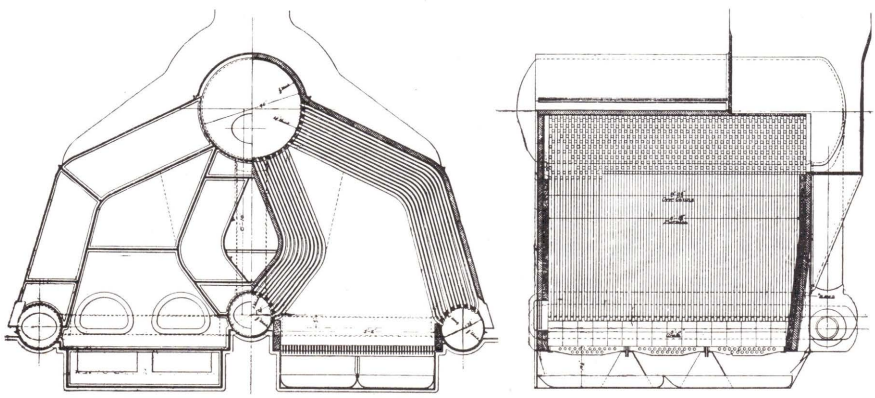
U. S. Torpedo Boat "Wilkes." Seabury Hull, Boilers and Engines



U. S. Destroyer "Bailey." Seabury Hull, Boilers and Engines



U. S. Destroyer "Stewart." Seabury Hull, Boilers and Engines



Seabury Safety Water Tube Boilers of Special Design as Installed in U. S. Destroyer "Stewart"

CONSTRUCTION AND MATERIALS

STEAM DRUM

The Steam Drum is constructed of a steel plate of tested tensile strength of from 55,000 to 65,000 pounds per square inch. After being rolled to shape, this plate is drilled and double-riveted along its longitudinal lap seam. Bumped heads of tested material are then riveted in place. The drum, before being drilled with the use of jigs, for tube holes, is then tested.

MUD DRUMS

The Mud Drums are usually constructed of lap-welded steel tube, into the ends of which are riveted flanges to which cast-steel cover-plates are secured by means of studs. In large boilers the mud drums are constructed similarly to the steam drum. Tube holes are drilled as in the steam drum, with the use of jigs.

TUBES

The Tubing, of which the greater part of the heating surface consists, is of seamless, cold drawn steel, cold bent to shape, with the ends expanded into the steam and mud drums. Before bending, however, the tubes are tested to a pressure of 1,000 pounds, and after bending are subject to further inspection. The size of the tubes varies in diameter according to the size of the boiler or character of the service to be performed.

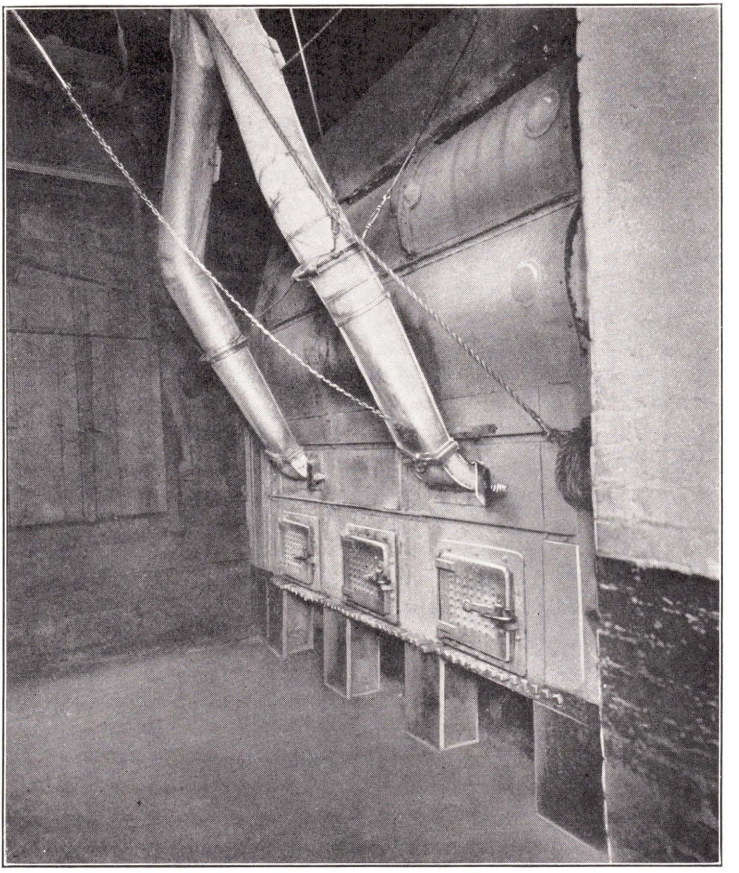
FURNACE

The Furnace is surrounded by water tubes which have an opening between them equal to their diameter, thus affording ample space for the hot gases of combustion to pass freely around all the tubes along their entire length.

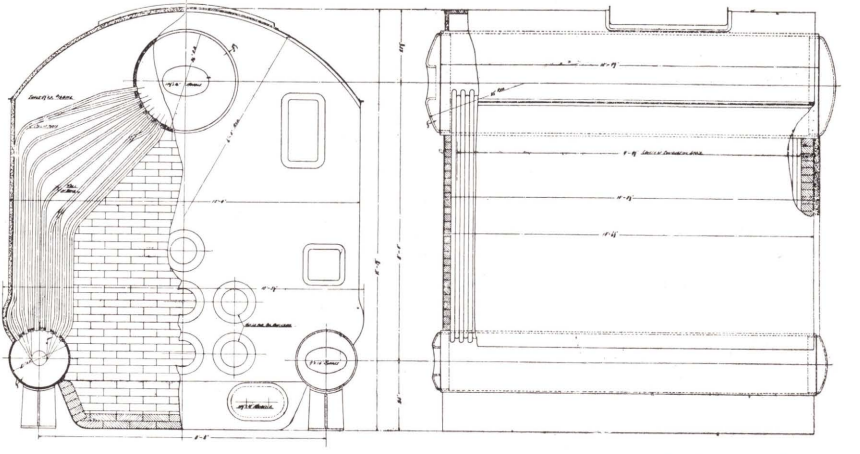
CASING OR BRICK SETTING

The boiler is encased in a substantial sheet steel jacket, stiffened with angles and lined on the inside with magnesia and asbestos, except at the ends of the combustion chambers, which are lined with fire-brick. The casing is fitted with all necessary fire and cleaning doors.

This arrangement makes unnecessary any extensive brick setting. If, however, for stationary practice, a brick setting is preferred, the steel casing would then be omitted and the brick-work constructed. The usual steel front would, in this case, be provided.



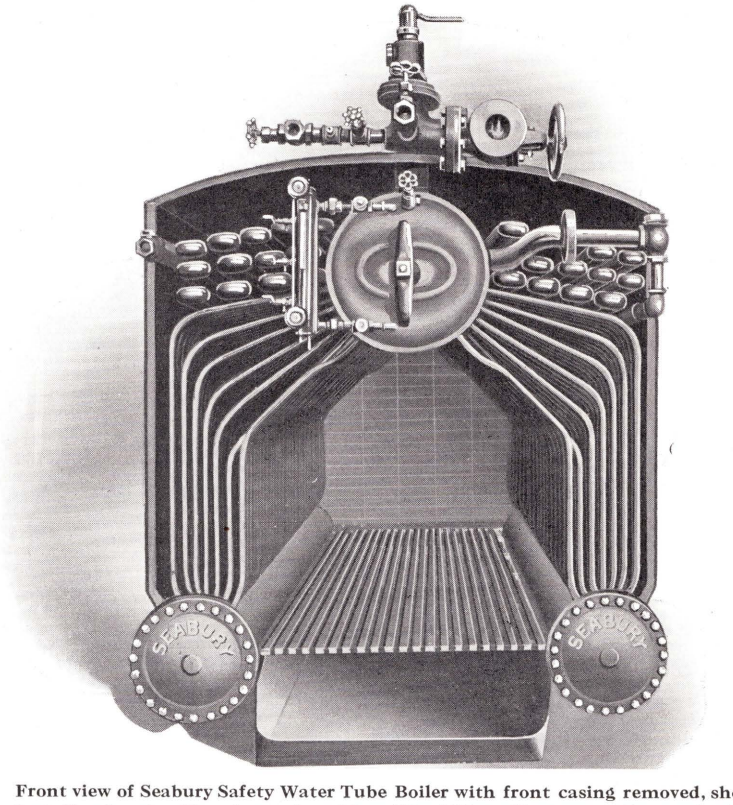
Seabury Safety Water Tube Boiler with attachment for utilizing saw mill waste automatically fed through chutes by blower in saw mill 400 feet distant. At works of Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, N. Y.



Seabury Safety Water Tube Boiler (without heater) designed for Oil Fuel only and U. S. Navy Type Oil Fuel Burners

COMBUSTION CHAMBER

The Combustion Chamber, located between two walls of water tubes, is of ample proportions. The openings in the tube walls are so arranged as to necessitate the passage of the hot gases around all the tubes for their entire length and then between the tubes of the feed water heater—when same is furnished—to the uptake.



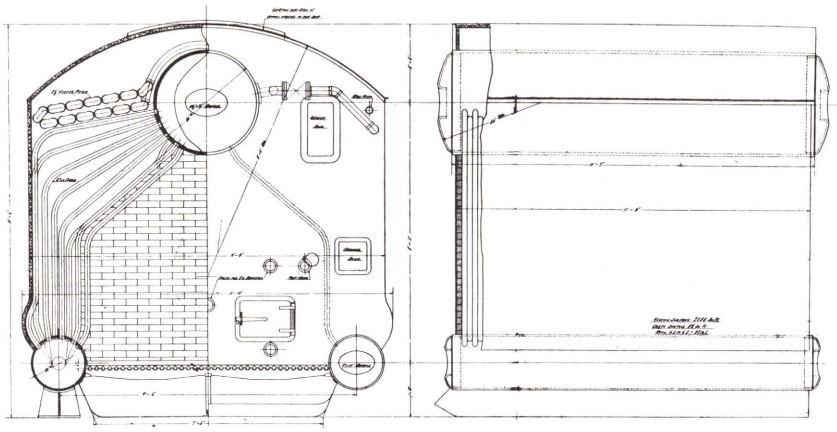
Front view of Seabury Safety Water Tube Boiler with front casing removed, showing large Combustion Chamber and position of Feed Water Heater over Generating Tubes

FEED WATER HEATER

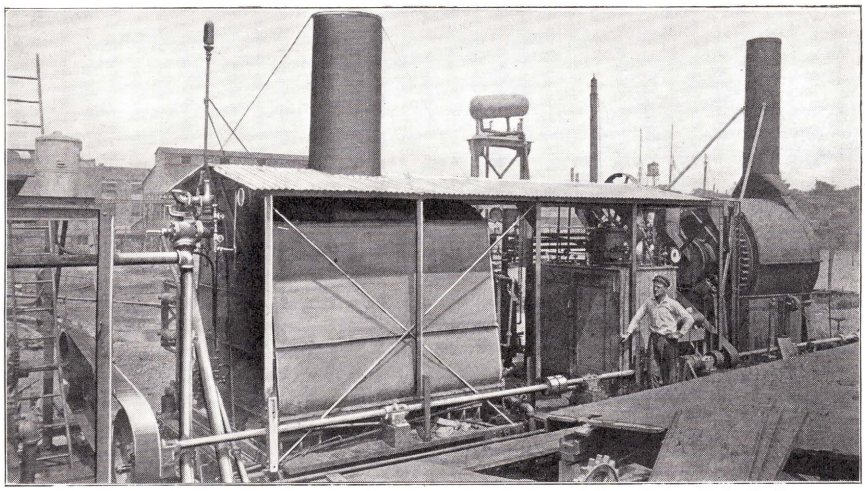
The Feed Water Heater is made of the best lap-weld steel pipe (where size permits) with extra heavy malleable iron return bends. After the heater has been assembled, it is tested to a pressure of 1,000 pounds.

GRATE BARS

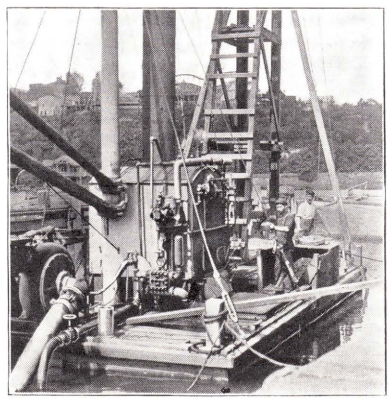
For anthracite fuel the grate bars are of wrought iron and of the well-known shaking type. For the use of bituminous fuel, cast-iron grate bars are furnished. Any part of the fire may be readily cleaned at any time. Our grate bars are the simplest and best made, the cheapest in repair and may be readily adapted to coal or wood fuel. (See "Fuels," page 19.)



Seabury Safety Water Tube Boiler, Arranged for Coal or Oil Fuels



International Pavement Co.'s Working Car, with Seabury Safety Water Tube Boiler, Using Fuel Oil



Seabury Safety Water Tube Boiler Operating Pile Driver and Suction Dredge

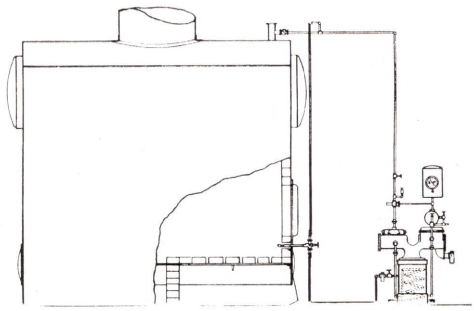
COAL AND WOOD FUELS

We frequently have inquiries from those who use wood fuel. Wood fuel can be used with SEABURY coal-burning boilers, if desired, but if wood is to be used exclusively, the combustion chamber would be made somewhat higher than otherwise and the size of the furnace door would be increased. This would increase the height of the boiler a little.

The SEABURY boiler has a decided advantage over the majority of boilers inasmuch as it *does not* require a special set of grate bars for wood; those furnished with the boiler may be adjusted for burning wood. (See "Grate Bars," page 17.)

OIL FUEL

Because of the large combustion chamber the SEABURY WATER TUBE BOILER is particularly well adapted for the complete combustion of fuel oils, as has been conclusively proven in practice. Any of the oil-burning systems can be readily applied to our boilers. We make no recommendation as to any particular type or system because of the variations in the physical properties of the fuel oils available in the different parts of the world. A heavy oil may completely defeat the proper operation of a burner which would give excellent results with light oils, and vice versa.



Side Elevation, Seabury Boiler and Oil Fuel Arrangement

We are prepared by experience, however, to offer our patrons every possible advantage in the selection of a burner most suitable for their available oil-fuel supply.

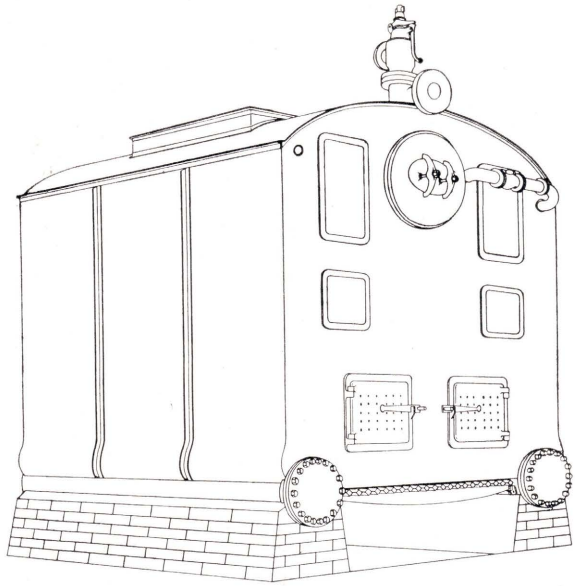
FOUNDATION AND SUPPORT

The SEABURY WATER TUBE BOILER requires no elaborate foundation, brick or other structural support. Unless otherwise ordered, they are furnished with iron saddles or supports attached to the bottom drums to be bolted to the boiler-room floor. These are equally serviceable for stationary and marine installations. If preferred, however, brick piers or beds may be built, about 12 inches high, to receive the mud drums, as shown on page 20.

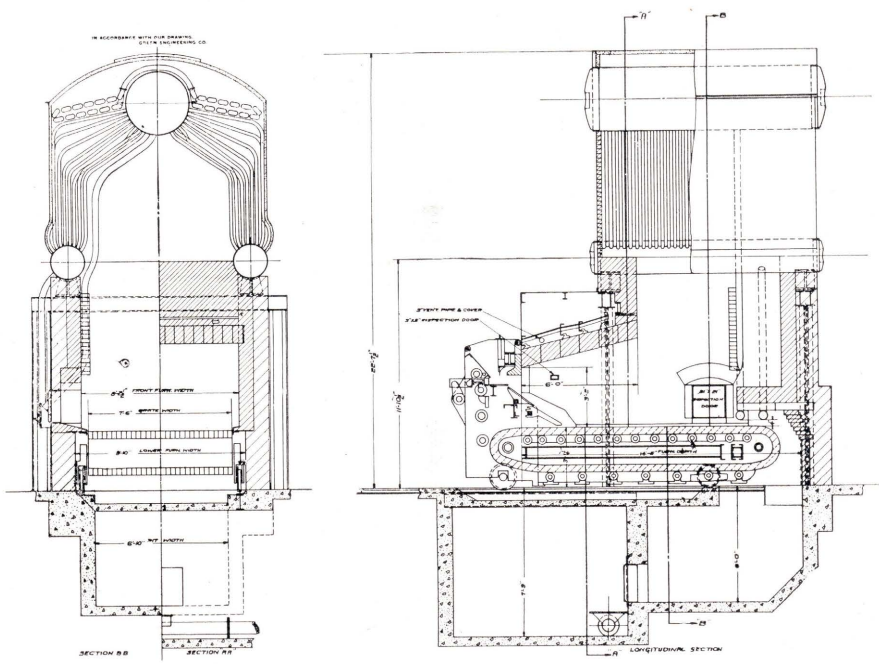
ASH PAN OR ASH PIT

When iron saddles are furnished (see "Foundation") a galvanized iron ash pan is suspended between the mud drums. This arrangement, apart from its necessity for marine installations, is very desirable where it is proposed to install additional boiler capacity in a stationary plant, as it simplifies the installation to placing the boiler in the desired position on the floor and bolting down.

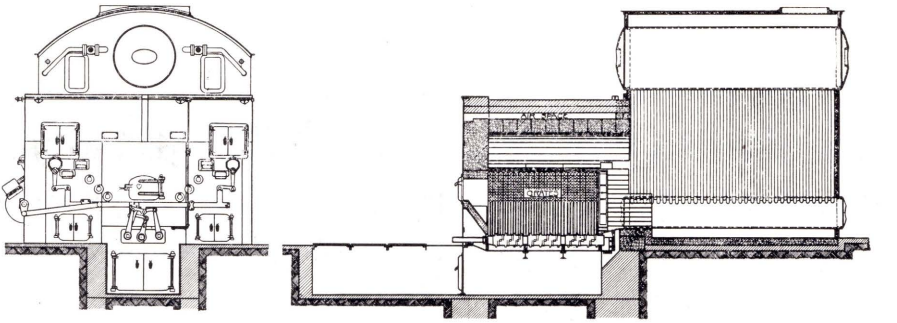
If brick piers are to be built or if the boiler is to be bricked in, the ash pan is then not furnished, unless specified, as an ash pit is then constructed in the floor proper. (See plate on page 20.)



Seabury Safety Water Tube Boiler for Stationary Service, Showing Simplicity of Brick Piers for Foundation and Support Under Mud Drums



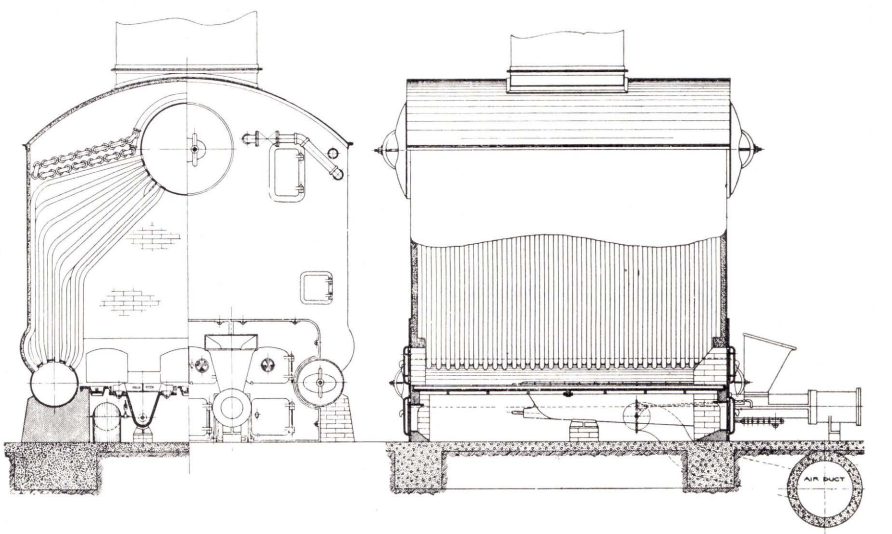
Seabury Safety Water Tube Boiler for Stationary Service Fitted with "Greco" (Green Engineering Co.) Chain Grate Mechanical Stoker



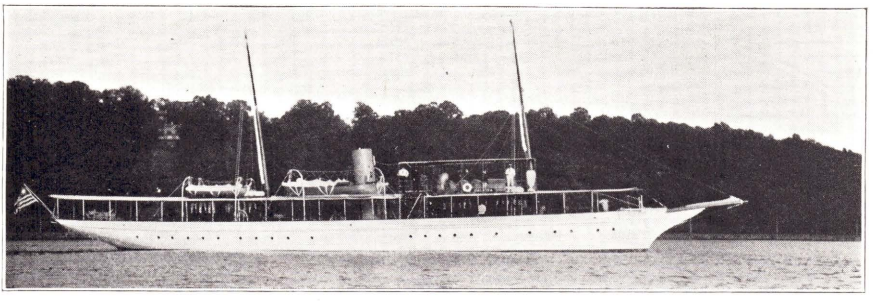
Seabury Safety Water Tube Boiler for Stationary Service Fitted with Murphy (Murphy Iron Works) Mechanical Stoker

AUTOMATIC STOKERS

Most of the Automatic Mechanical Stokers on the market are readily adaptable for use with SEABURY boilers. The plates on this page and page 20 show the Green Chain Stoker, the Murphy Stoker and the Jones Under-Feed Stoker as applied to the SEABURY boiler. The small dimensions of the SEABURY boiler make possible the use of Automatic Mechanical Stokers in installations where boilers of larger dimensions per corresponding boiler capacity would not permit of their installation.



Seabury Safety Water Tube Boiler for Stationary Service, Fitted with Jones (Under-Feed Stoker Co.) Under-Feed Mechanical Stoker



Steam Yacht "Galatea"

DETROIT, MICH., October 2, 1914.

Charles L. Seabury & Co.,
Morris Heights, N. Y.

DEAR SIRS—Your favor of the 27th ult. regarding my experience with Seabury Boilers, would say that after six years' experience with one in the old "Galatea"—which was three years old when I took charge—I thought well enough of it to specify them for our new "Galatea."

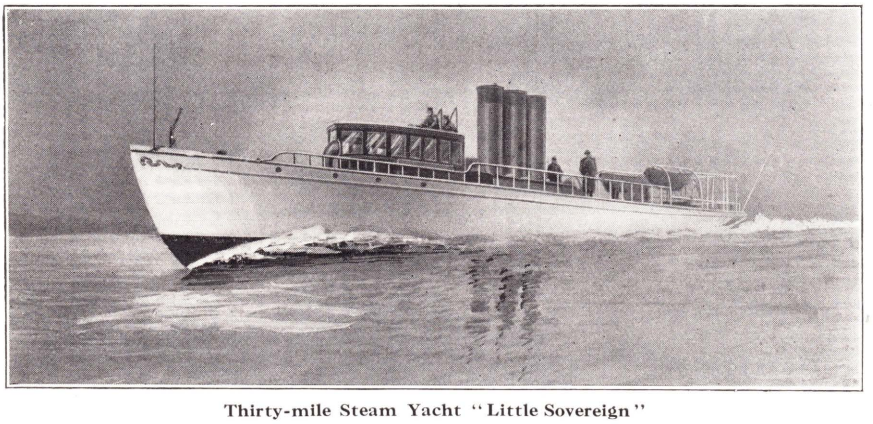
We have been in commission two months since leaving shipyard, and am pleased to say the results are far and away beyond all expectations.

Have laid up the forced draft system entirely; am getting plenty of steam, natural draft.

My plant is ready for inspection at all times, and would be pleased to answer questions at any time regarding Seabury Boilers. I am, very truly,

F. G. CAREY,
Engineer "Galatea."

1524 Jefferson Avenue, East.



Thirty-mile Steam Yacht "Little Sovereign"

NEW YORK CITY, October 3, 1914.

Gas Engine & Power Co. and
Charles L. Seabury & Co., Cons.

DEAR SIRS—Referring to your inquiry regarding my experience with the Seabury Water Tube Boilers, would say that I have handled this type of boiler for about nine years and have found them first-class in every way. Very truly yours,

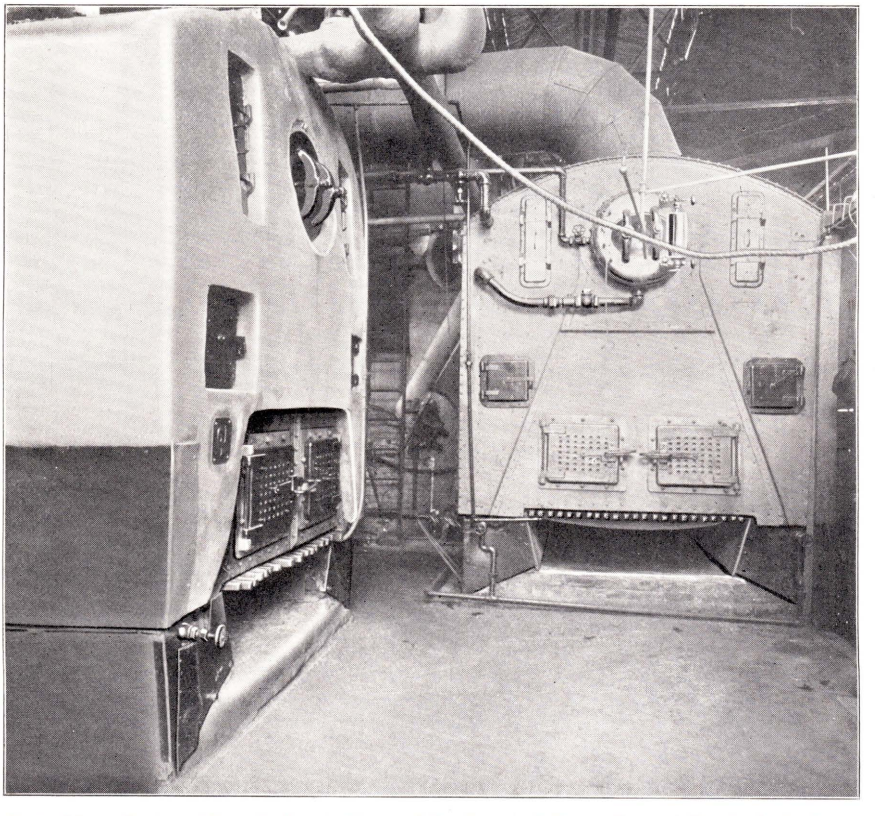
JAMES MCDONALD,
Chief Engineer "Little Sovereign."

CIRCULATION

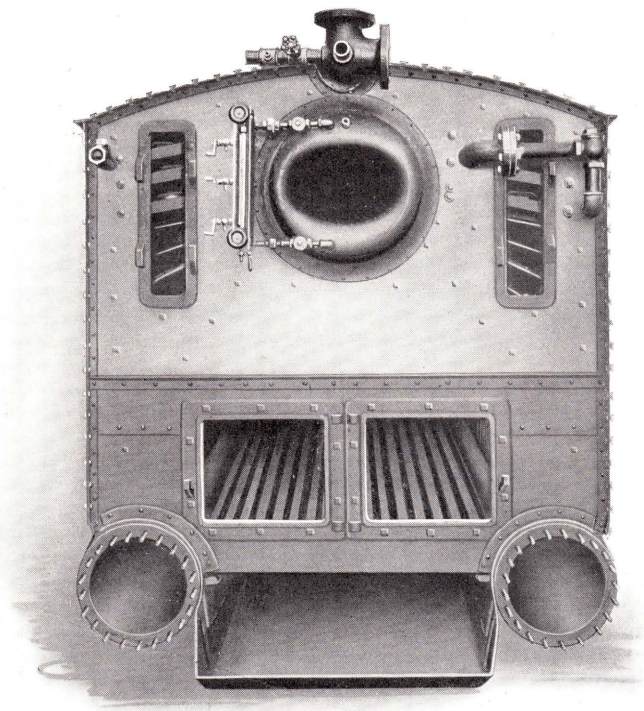
The circulation in a SEABURY boiler is perfectly free and unobstructed. After passing through the heater, the water enters the steam drum at a temperature of about 250° Fahrenheit.

The generation of steam is maximum in the tubes next to the fire, decreasing in the rows further removed. In the former the circulation is upward, while in the latter or outer row the circulation is downward, the cooler tubes serving to return the water to the lower drums.

In boilers which are called upon to perform exceedingly high duty service, the feed water, after passing through the heater, is divided and introduced into the lower drums, *making it absolutely impossible to drive the water out of the tubes, even with the most intense fire.*



Part of Installation of Four Boilers in Shops of Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, Morris Heights, N. Y.



Seabury Safety Water Tube Boiler, with Cleaning Doors, Manhole and Handhole Covers and Fire-doors Removed for Cleaning

YACHT MASTERS' AND ENGINEERS' ASSOCIATION OF MASSSACHUSETTS
Club Room, Lawley's Yard

NEPONSET, MASS., October 3, 1914.

MY DEAR MR. POTTER:

Your letter received, and would have written you before but have been quite busy hauling up for the winter. Another season on the old sled and she runs like a Waltham watch. We have not had any trouble at all and the boiler is still tight as a diving suit. In regard to my experience with the Seabury Boiler, I cannot speak too highly of it, not only for its efficiency but its steaming qualities. In my opinion, it is one of the most economical pipe boilers on the coal bunkers that I have been with, and I have been with a few different ones. I also think it is as durable as most pipe boilers, if properly taken care of. I would not like to say that I have taken care of this one properly, but have done so to the best of my ability. I am on my first set of grate and bearer bars, the ash-pan is in good condition and only one new set of furnace lining in six years. I should think that would help your boiler some. And I have, while running, carried steam up to 275 and 290 pounds, and the tubes seem to be in good shape as far I can see.

I am as ever and at all times,

Respectfully, your friend,

FRANK A. TRAFTON.

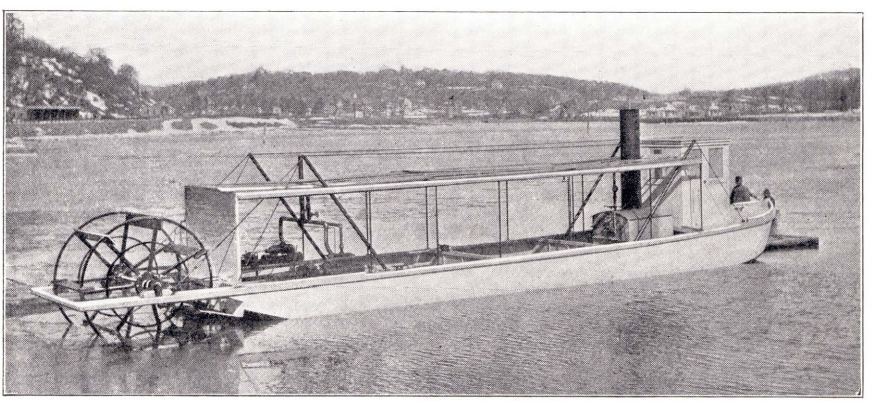
FEED WATER AND SCALE-FORMING SUBSTANCES

Impurities which may become scale-forming substances may be in solution in feed waters in quantities varying from a fraction of a pound to several pounds per thousand gallons, and their presence is often manifest only through a chemical analysis of the feed water supply, or after the boiler has been in use, when these substances are deposited as products of distillation. This deposit in the mud drums, which are especially intended for the purpose, may be readily removed as elsewhere explained, but the interior of the generating tubes is also susceptible to a deposit of this scale-forming substance, and it should be carefully watched and removed. A deposit of 1/16 inch of scale will cause an increase in fuel consumption of over 12 per cent., as the scale is a very poor conductor of heat, while an incrustation of ¼ inch "will require an expenditure of more than three times this quantity of fuel to perform the same duty as a boiler with a clean shell and tubes."*

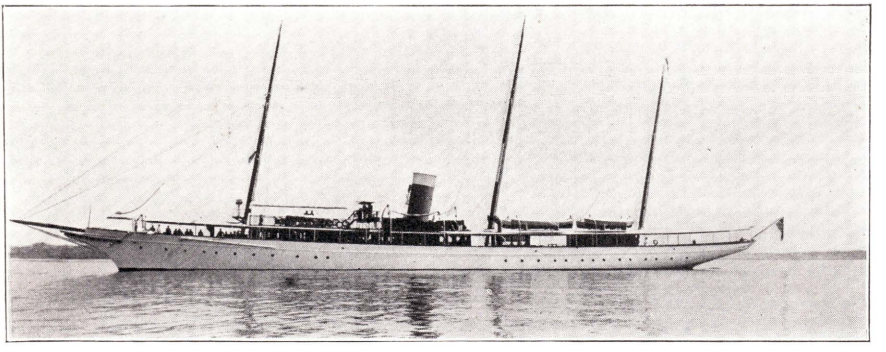
This scale-forming tendency of feed water must not be confused with the mechanical design or operation of the boilers. It is an unavoidable chemical and not mechanical action and must likewise be chemically rectified. This comes within the category of feed water specialists and not of the boiler manufacturer except that in the design of the boiler the fact that there will be scale formation must be taken into account. This has been done with the SEABURY WATER TUBE BOILERS in the position of the tubes, which is most unfavorable to ready deposits and causes foreign matter in the water to drop to the bottom of the mud drums below the fire level, where it can do the least harm and where it can be more readily removed.

Feed waters containing scale-forming substances should be given the proper chemical treatment, which can be determined only by chemical analysis. These substances vary greatly in the different waters, and the treatment most effective for one feed water might increase the scale-forming properties of another water. For that reason we make no recommendation on this score, save that it is the wisest policy to give the matter the attention it deserves, and that the chemist or feed water specialist, of whom there are many, be consulted.

*G. W. Lord, in "Boiler Troubles and Their Treatment."



Light-draft Cargo Steamer for Brazil. One of Several Types Built for South American Service. Seabury Hull, Boiler and Engine



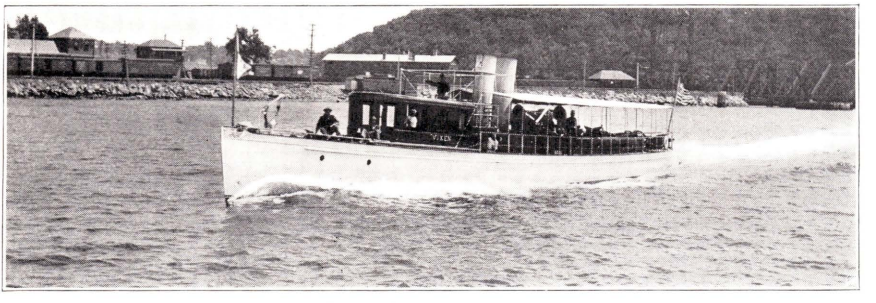
Steam Yacht "Kanawha"

September 24, 1914.

Gas Engine & Power Co. and
Chas. L. Seabury & Co., Cons.,
Morris Heights, New York City.

GENTLEMEN—I honestly believe there is no better water tube boiler on the market or one that will stand the hard driving that the Seabury Boiler will. On the steam yacht "Felicia," after running them for eight years, Mr. Metcalf insisted on retubing; we found, on cutting out the old tubes, by sawing, and measurment as to thickness, that they were apparently as good as the day they were put in. My experience with the Seabury Boiler on the yachts "Huntress," "Hiawatha," "Marjencha" and "Kanawha" has been that they give the best of satisfaction to the owner and the engineer.

(Signed) W. T. SMITH,
Tiverton, R. I.



Steam Yacht "Vivace"

NEW YORK, July 26, 1914.

Gas Engine & Power Co. and
Charles L. Seabury & Co., Cons.

GENTLEMEN—In regard to your inquiries as to my experience with your boilers, I have had a great deal of experience with them in the last fifteen years and have never had any trouble with them.

They are without doubt the best water tube boilers on the market. Safe, economical and easily handled. Yours truly,

A. R. SLOCUM.

INSTRUCTIONS FOR THE OPERATION AND CARE OF SEABURY WATER TUBE BOILERS

When the boiler is ready for steam, the water should be at about the middle of the upper drum. This is the normal water level and should be maintained within an inch above or below whenever the boiler is under steam.

The outside of the tubes should be cleaned occasionally by removing the cleaning doors on the boiler front. Two doors on small boilers and four doors on the larger sizes are provided for this purpose, affording access to the spaces between the heater pipes and the generating tubes. A steam tube cleaner is provided with each boiler for this purpose. Further cleaning can be done when the boiler is cold by entering the fire-box and blowing through the spaces between the lower ends of the tubes.

The SEABURY WATER TUBE BOILER is one of the few boilers whose heating surfaces can be quickly and thoroughly cleaned—a feature most important in a boiler where sustained economy is desired.

The interior of the tubes should be thoroughly cleaned once a year if there are signs of an accumulation in them. To clean the interior of a boiler the first procedure is to boil out with soda or other boiler compound (see page 25) and blow down a number of times. If further attention is necessary the bottom drum heads and manhole plate in the steam drum should be removed. A chain with a wire brush attached can then be passed through each tube.

See that ashes are thoroughly removed from the ash pan or pit, and mud drums, by taking out the grate bars and bearing bars, and going into the furnace for a personal examination.

See that water is kept in the ash pan or pit at all times, to prevent bearing bars overheating and dropping down.

See that gauge glass is clear, by shutting top valve and blowing through small drain cock at bottom of glass. Shut the bottom valve, open top valve, and blow through again. This should be done frequently.

See that water column is blown out in the same manner as suggested for the gauge. See that water level in gauge glass is true by verifying with try cocks.

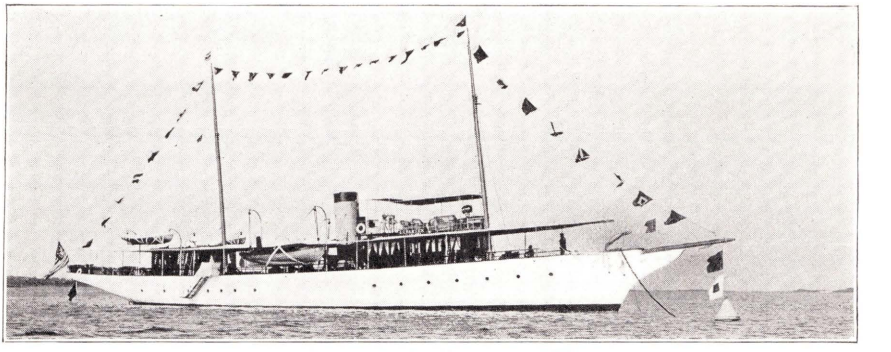
See that gauge glass is shut off when leaving boiler for the night, as glass might break and lose all the water. This is most likely when boiler is under banked fires. See that gauge glass connections are full open in the morning, before hauling down or building fires.

See that safety valve is in working order at all times and will open when the blowing point is reached by steam pressure.

See that fire-door latches are in good working order at all times and are latched when doors are closed.

See that oil is not used inside the engine, or if so that efficient grease extractor is installed. If oil must be used, be sure to use something in the boiler at least once a month to counteract it, such as concentrated lye, potash or washing soda.

See the inside of upper drum at least once a month, that you may know just what condition it is in.



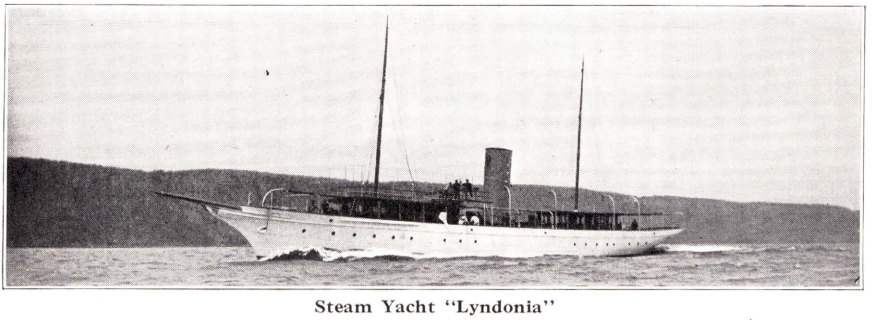
Steam Yacht "Levanter III"

October 8, 1914.

After my experience with most all kinds of steam boilers for twenty-five years and for fourteen years with the C. L. Seabury Company's Steam Water Tube Boiler, will say they will carry steady water, are rapid steamers, and will stand the very hardest kind of forced draft. The feed-water heater is the best, the feed water being practically steam before entering the boiler. Have never experienced any trouble of any kind. They are easy to clean or repair.

Yours truly,

F. J. SMITH,
Chief Engineer, Steam Yacht "Levanter III."

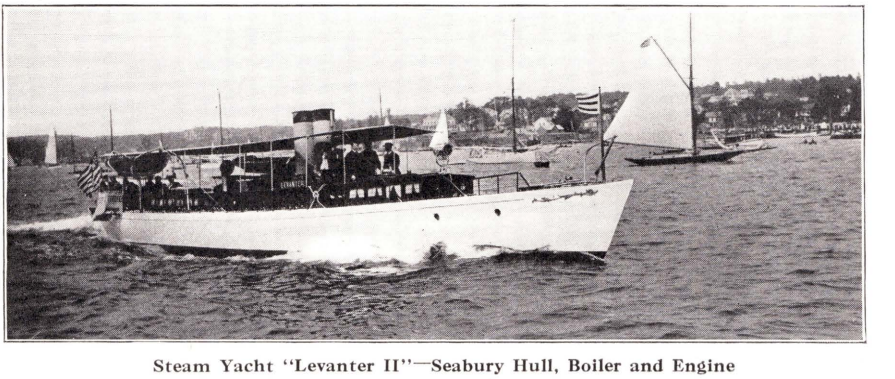


Steam Yacht "Lyndonia"

CAMDEN, ME., September 26, 1914.

If I were again to put in a new boiler, it would be a Seabury Safety Water Tube Boiler, as I have had thirteen years' experience with them and had no trouble whatever.

A. B. BENNETT, Chief.

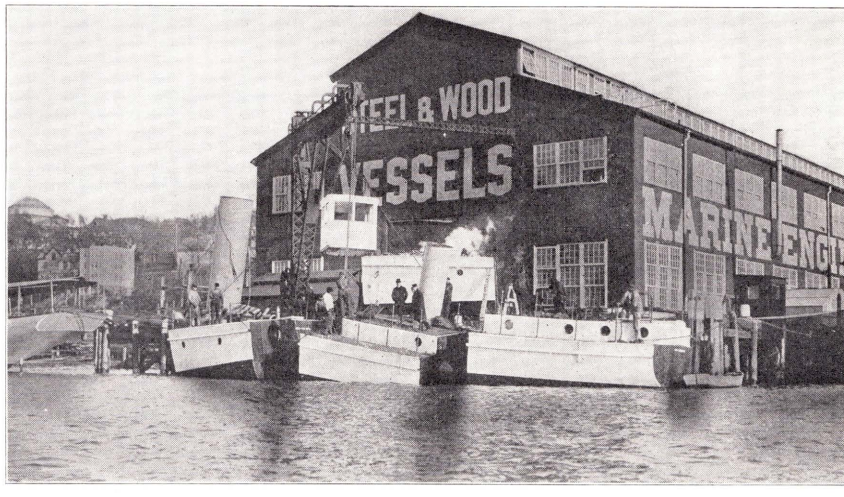


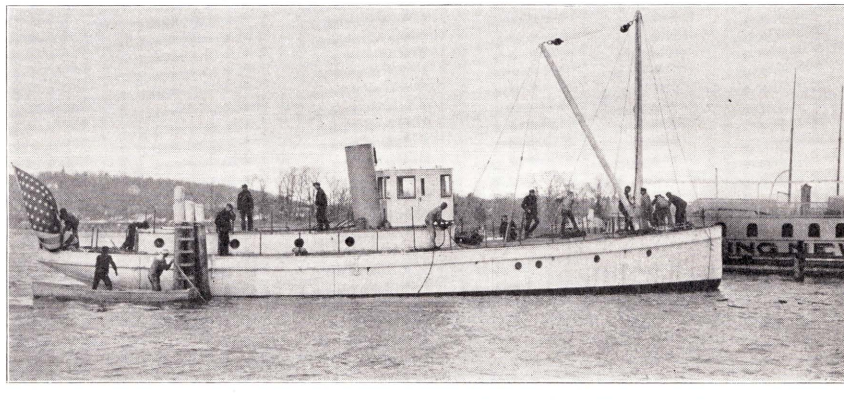
Steam Yacht "Levanter II"—Seabury Hull, Boiler and Engine

LAYING UP

To see that the boiler is properly laid up, blow all water out of tubes and feed-water heater. This can be done by taking both valves out of checks near boiler, filling boiler to proper level with water, disconnecting the feed pipe outside of first check valve, and place a globe valve, leading to a convenient drain. Make a slow fire and raise steam pressure to fifty or seventy-five pounds, then open both bottom blow-off valves until water disappears in glass gauge, then open valve in the feed pipe and blow back hot steam through the feed-water heater. Leave all valves open until all steam is out of the boiler, and there will be no water left in any part of it.

If these simple instructions are followed the boiler will last many years and give most excellent service.





Sectional Steamer "Pontonier" for United States Army Philippine Service.
Seabury Hull, Boiler and Engine

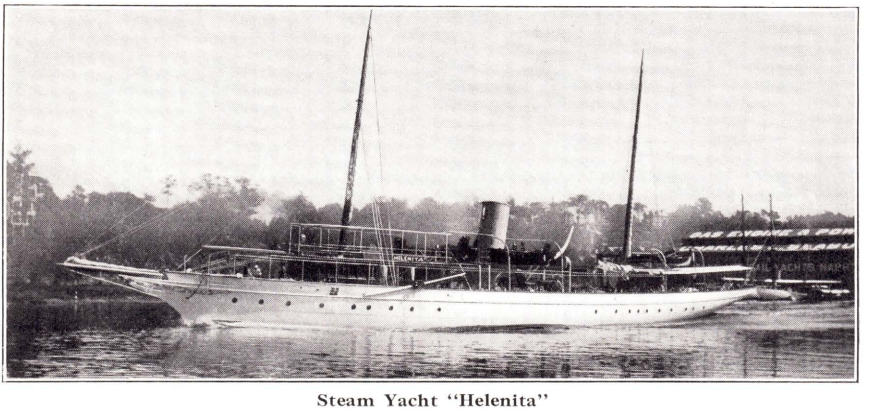
Steam Yacht "Vixen"

TARRYTOWN, N. Y., October 17, 1914.

Gas Engine & Power Co. and
Charles L. Seabury & Co., Cons.,
Morris Heights, N. Y. City.

DEAR SIRS—Would say in answer to your query regarding the Seabury Boilers that my experience with them for the past twenty-five years has been satisfactory in every particular. I have found them economical, easy to care for and quick steamers, and am glad to say a good word for them at any time. Very truly yours,

AMOS MOSHER,
Chief Engineer.



Steam Yacht "Helenita"

NEW YORK CITY, September 22, 1914.

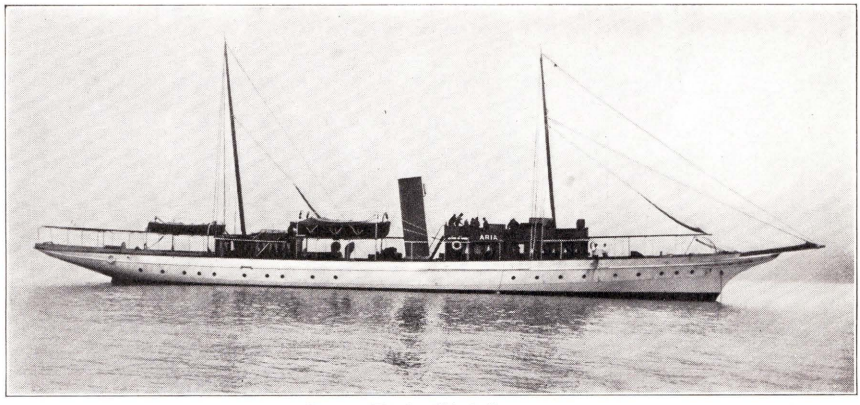
Gas Engine & Power Co. and
Charles L. Seabury & Co., Cons.

GENTLEMEN—I have been using the Seabury Safety Water Tube Boilers since 1897; they have always given entire satisfaction in every detail.

I have used two of your large double-enders for seven years, using forced draft and getting steam very quickly. In that time the only repairs that were needed was the replacing of some fire-brick; they are in use today after thirteen years of service.

In my opinion there are no water tube boilers equal in any way to the Seabury Safety Water Tube Boilers.

J. E. OWEN,
Chief Engineer.



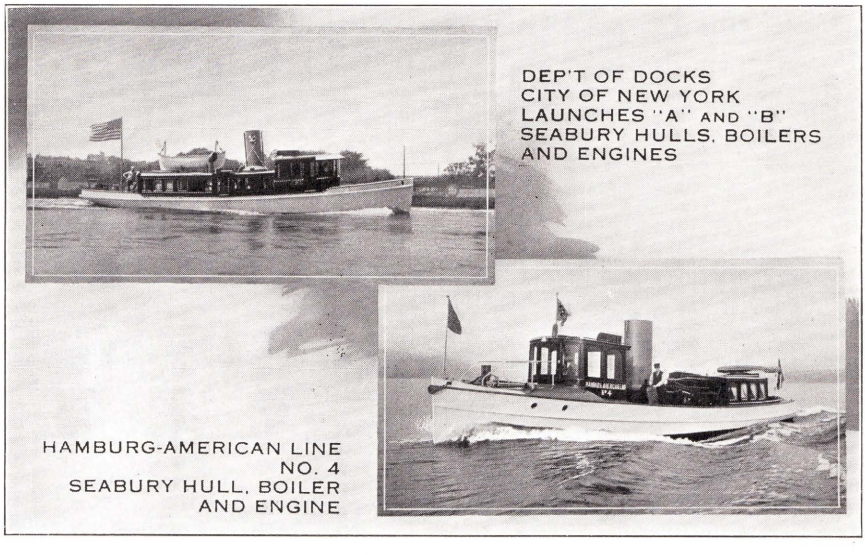
Steam Yacht "Aria"

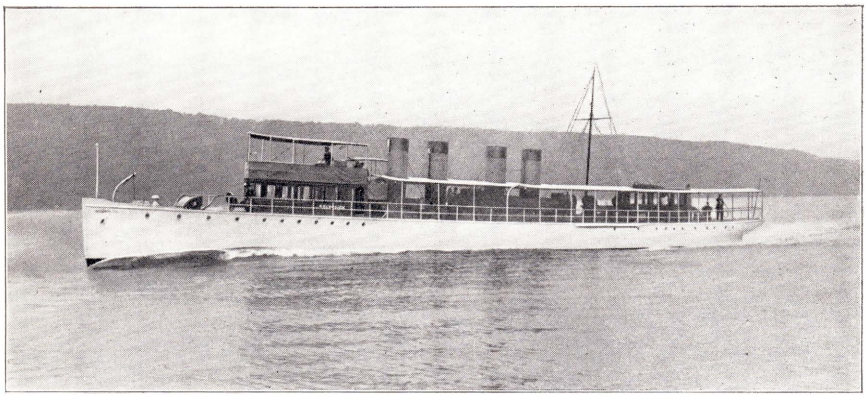
BANGOR, ME., October 1, 1914.

Gas Engine & Power Co.

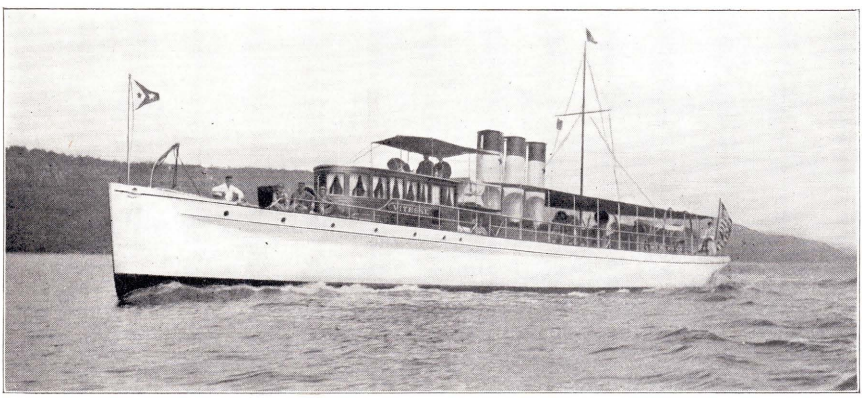
GENTLEMEN—Your letter at hand. Will say that I have had charge of the Seabury Water Tube Boiler for the past twelve years. I can recommend it very favorably as being a good generator, with a very steady water line. In fact, it is the best boiler in this respect that I ever had charge of. There is absolutely no tendency to prime, even with a full glass and in rough water. The circulation is first-class in this boiler, which is a prime consideration also.

LESLIE C. GRAY,
Chief Engineer.

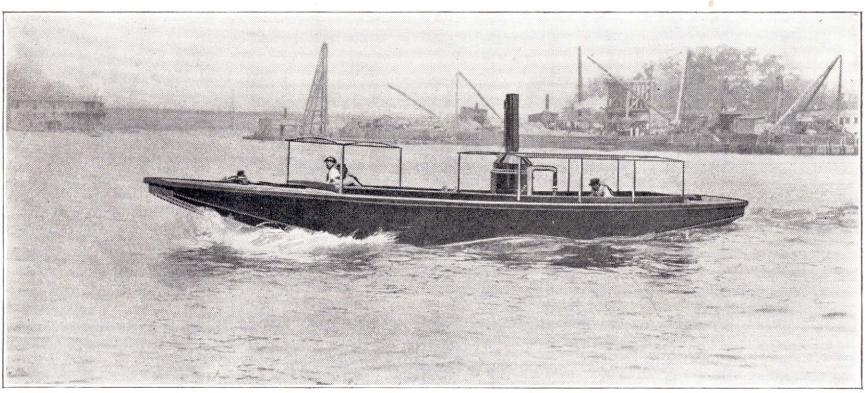




Thirty-nine-mile Steam Yacht "Sovereign." Seabury Hull, Boilers (Fuel Oil) and Turbines (Curtis Type)—Triple Screw



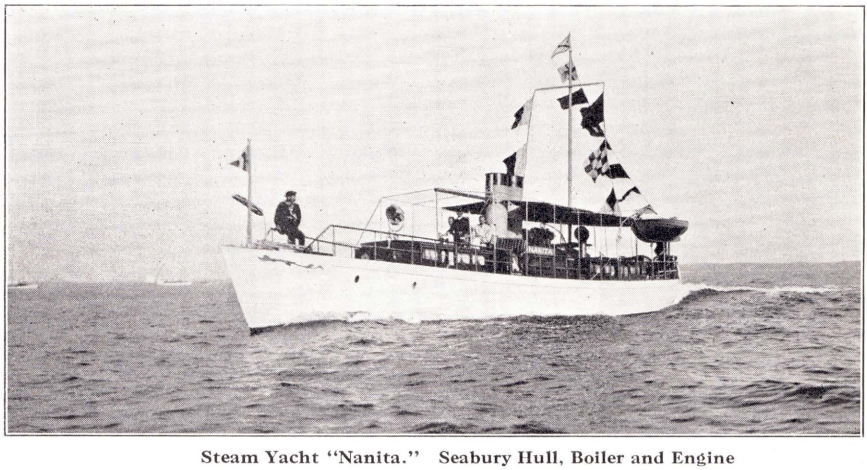
Thirty-two-mile Steam Yacht "Vitesse." Seabury Hull, Boiler and Engines



Shallow-draft Cargo Boat. Seabury Hull, Boiler (Special Vertical Type) and Engine. South American Service

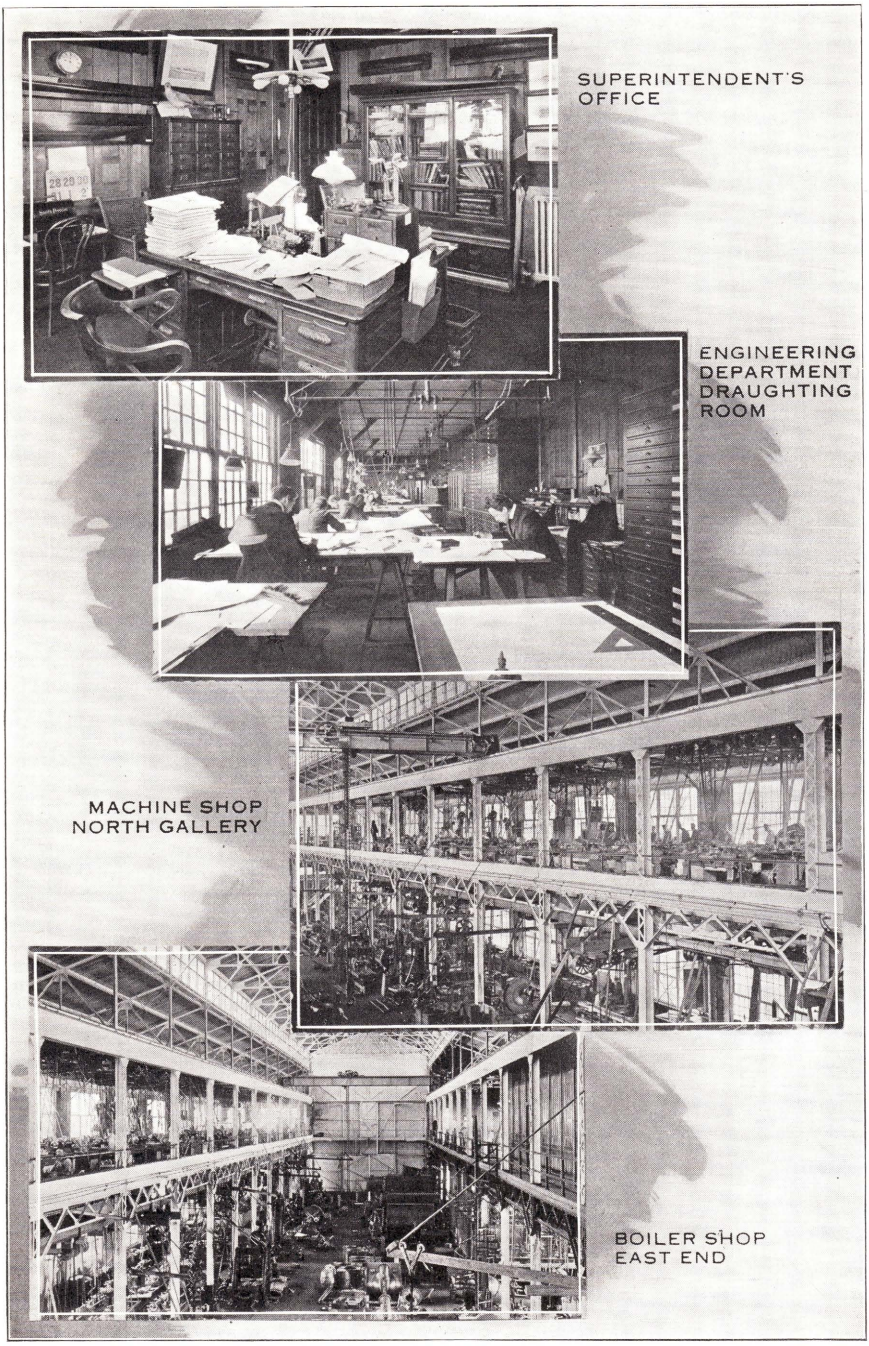
WHERE SEABURY BOILERS ARE BUILT

Views of the Yards and Shops of the Gas Engine & Power Co. and Charles L. Seabury & Co., Consolidated, located at Morris Heights, New York City, on the Harlem River, showing facilities for manufacture.



Steam Yacht "Nanita." Seabury Hull, Boiler and Engine

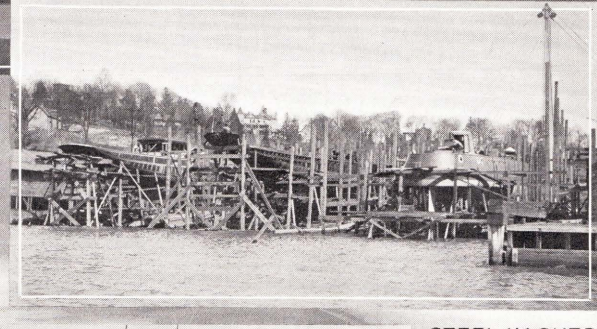
SHOP VIEWS


SUPERINTENDENT'S OFFICE
ENGINEERING DEPARTMENT DRAUGHTING ROOM
MACHINE SHOP NORTH GALLERY
BOILER SHOP EAST END

YARD VIEWS

CENTER BASIN FROM RIVER FRONT

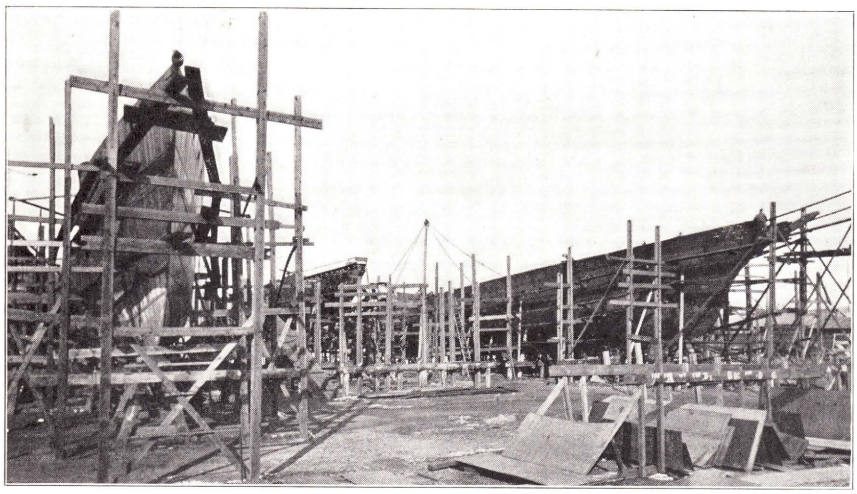
BIRD'S-EYE VIEW OF PLANT



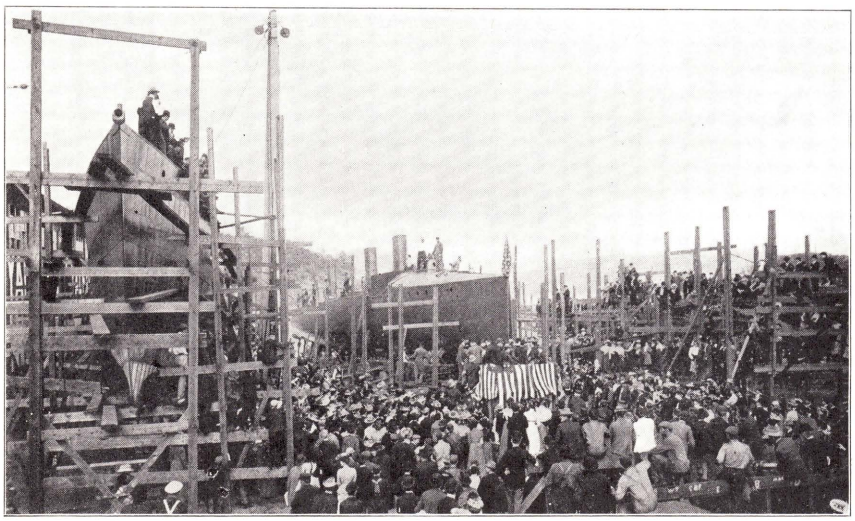
STEEL YACHTS AND TORPEDO BOAT DESTROYERS UNDER CONSTRUCTION

ENGINE AND BOILER SHOP FROM CENTER BASIN

YARD VIEWS

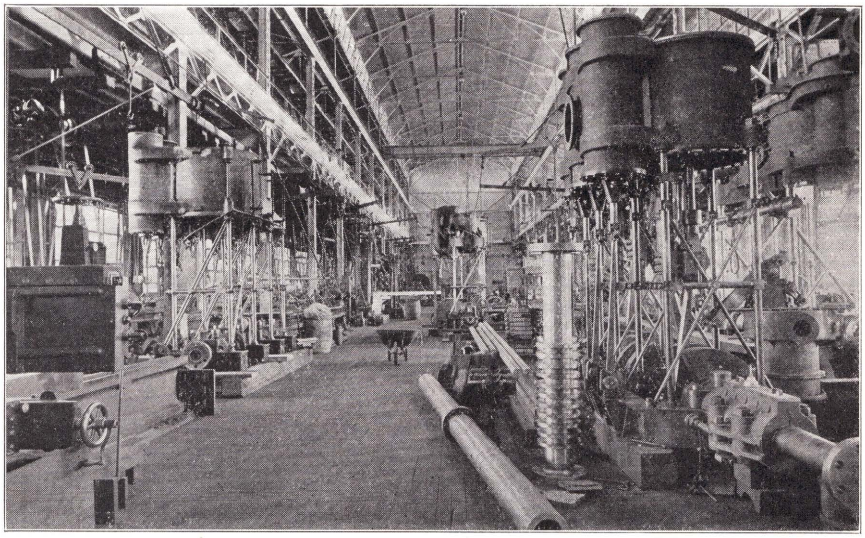


Yard View Showing United States Destroyer and Steel Yachts Under Construction.
Seabury Boilers and Engines Installed

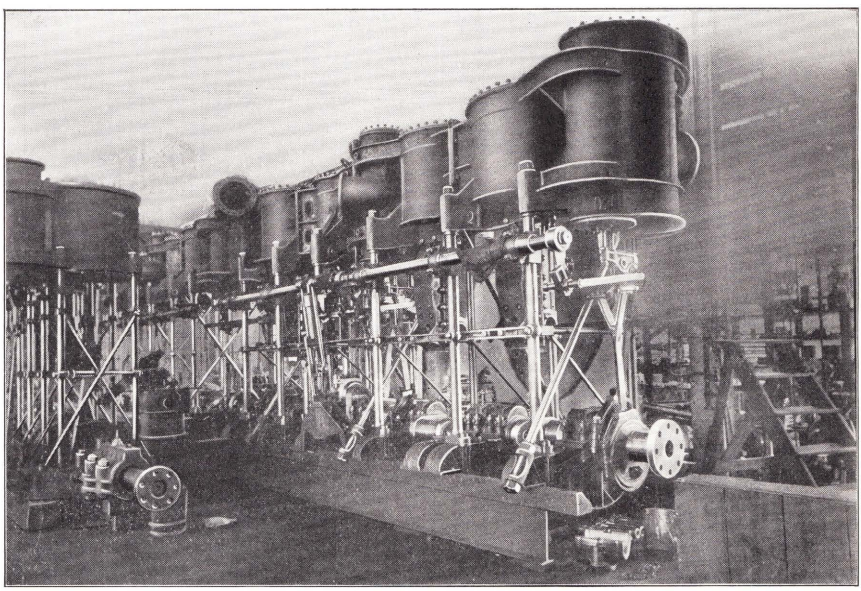


Launching of United States Torpedo Boat "Wilkes." Seabury Boilers and Engines Installed

SHOP VIEWS

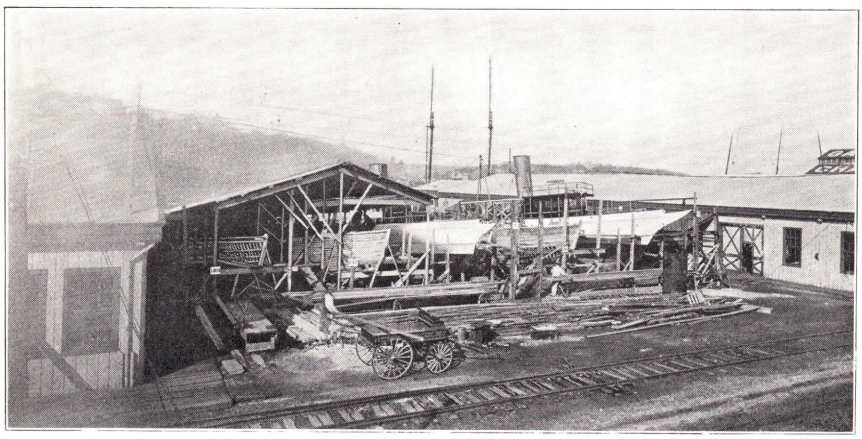


Erecting Floor, Machine Shop, Showing Seabury Marine Engines Under Course of Assembling

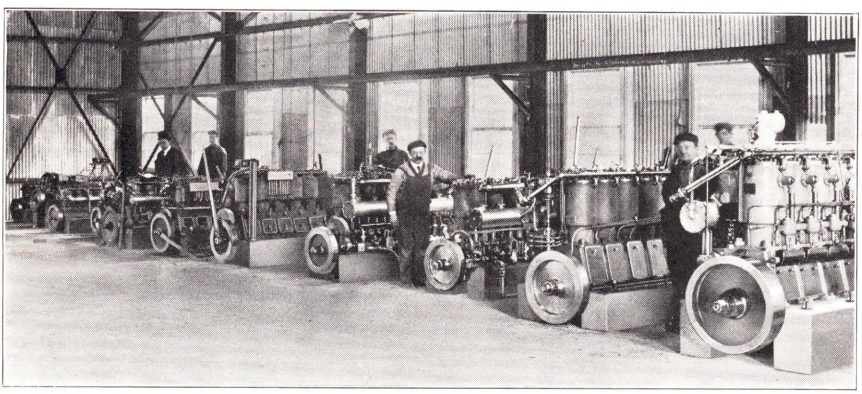


Erecting Floor, Machine Shop, Showing Seabury-built Engines Under Construction for United States Destroyer "Stewart"

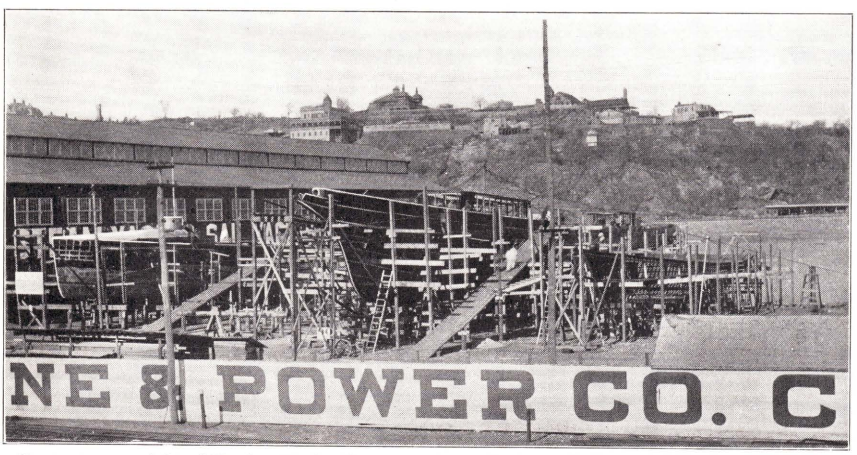
YARD AND SHOP VIEWS



Wooden Yachts Under Construction. Seabury Boilers and Engines Installed



Test House



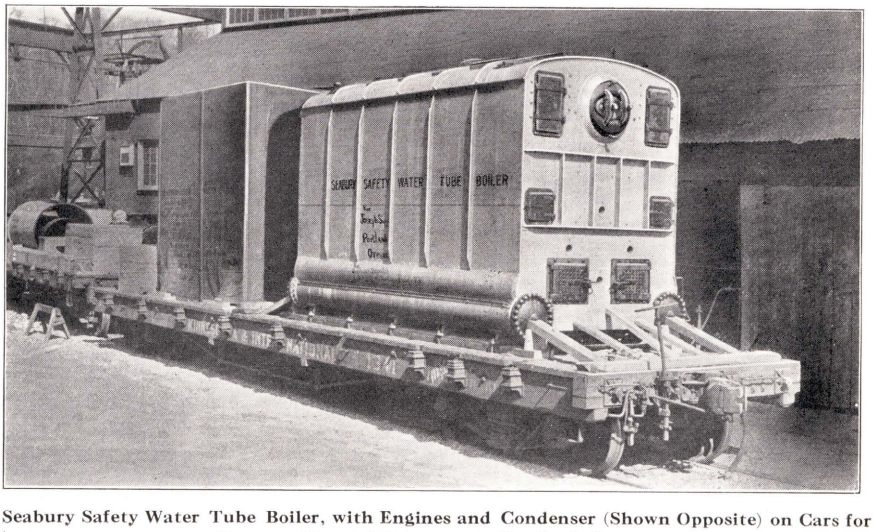
Destroyers and Steel Yachts Under Construction. Seabury Boilers and Engines Installed

OTHER SEABURY PRODUCTS

WE ALSO MANUFACTURE

TUBE EXPANDERS
TUBE CLEANERS
CURTIS TURBINES
STEAM BLOWER ENGINES
STEAM STEERING ENGINES
CONDENSERS
OIL ENGINES
GASOLENE ENGINES
ELECTRIC GENERATING SETS
MARINE SWITCHBOARDS
ALCOHOL RANGES
COAL RANGES
MARINE HARDWARE
PROPELLERS
YACHT TENDERS
LIFEBOATS
WOODEN AND STEEL YACHTS AND LAUNCHES

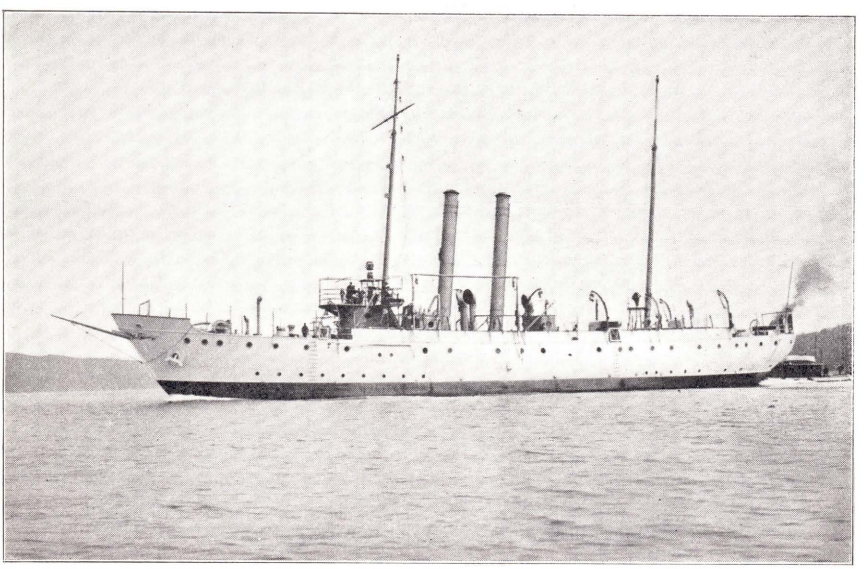
The following pages illustrate some of our other products which are fully described in their respective circulars or catalogues—sent on request.



Seabury Safety Water Tube Boiler, with Engines and Condenser (Shown Opposite) on Cars for Transcontinental Shipment to Portland, Oregon.

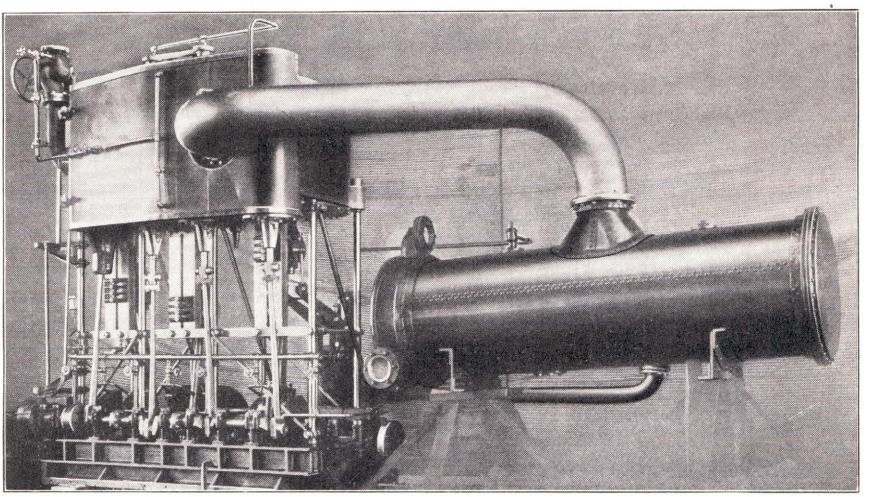
OTHER SEABURY PRODUCTS

United States Gunboat "Paducah." Built and Engined at the Seabury Yards

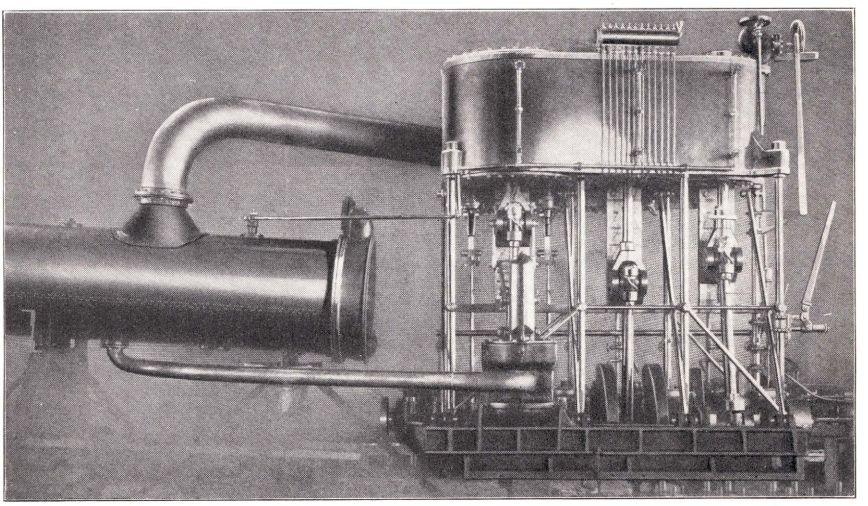


United States Gunboat "Dubuque." Built and Engined at the Seabury Yards

OTHER SEABURY PRODUCTS

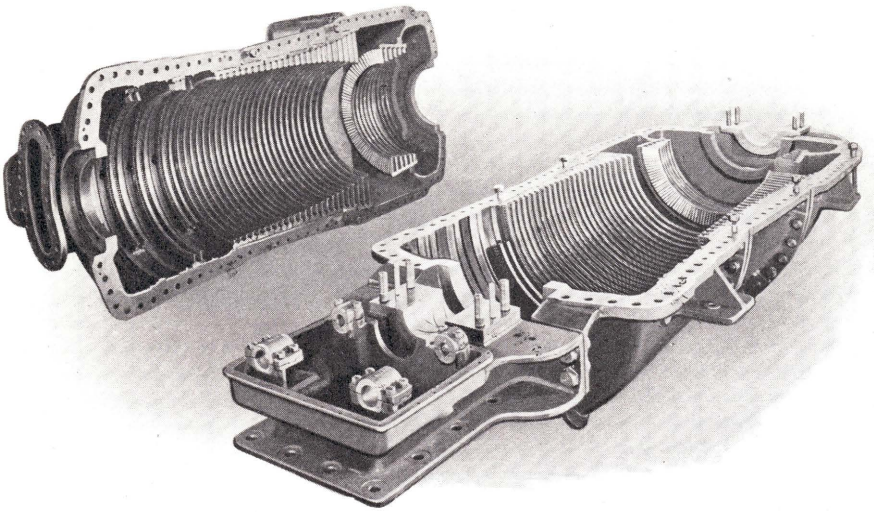


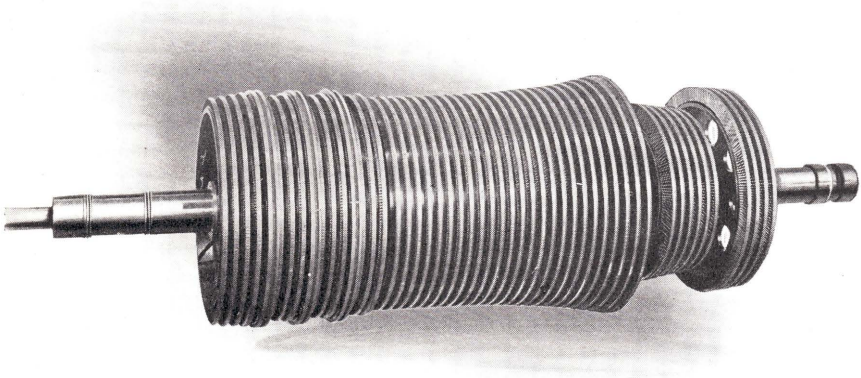
Seabury 18-Inch Stroke Triple Expansion Vertical Marine Engine and Condenser, Assembled in Shops Prior to Shipment to Portland, Oregon



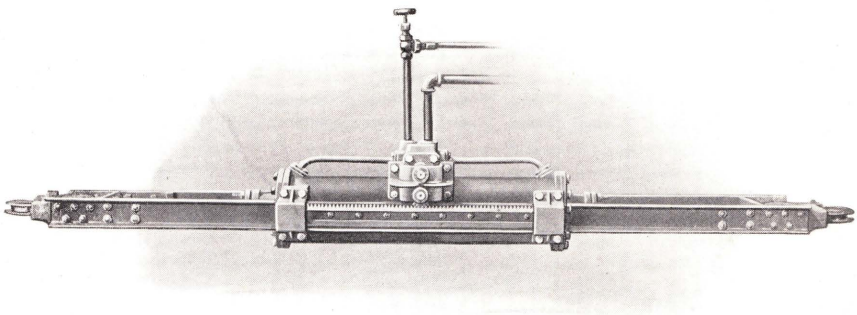
OTHER SEABURY PRODUCTS

CURTIS TYPE STEAM TURBINES

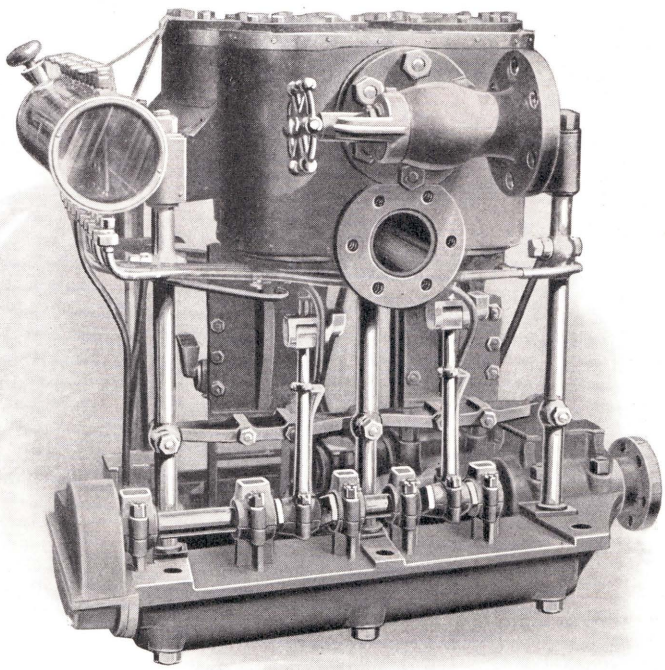




OTHER SEABURY PRODUCTS



Seabury Steam Steering Engine

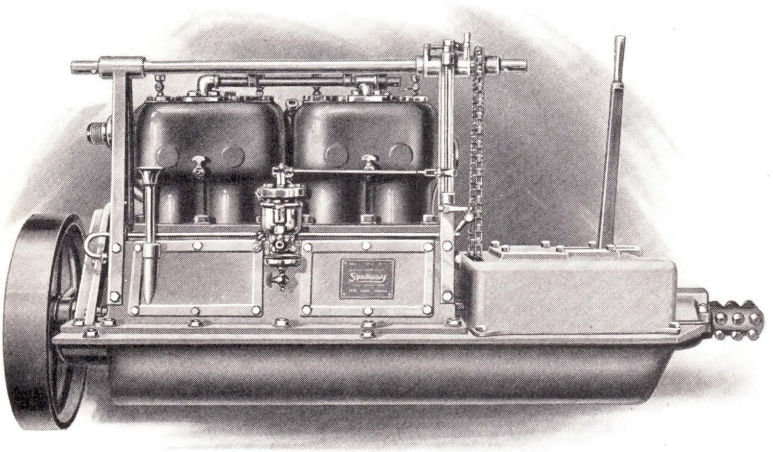


Seabury Steam Blower Engine

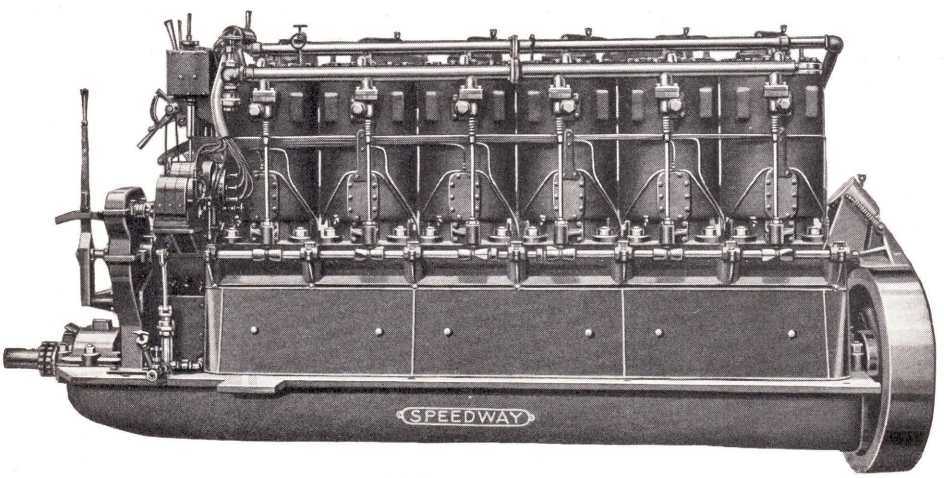
OTHER SEABURY PRODUCTS

Speedway

GASOLENE ENGINES



16-20 Horse-Power

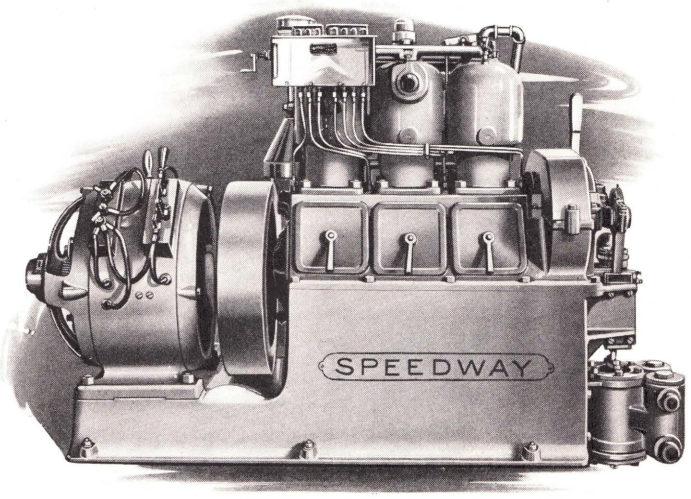


250 Horse-Power

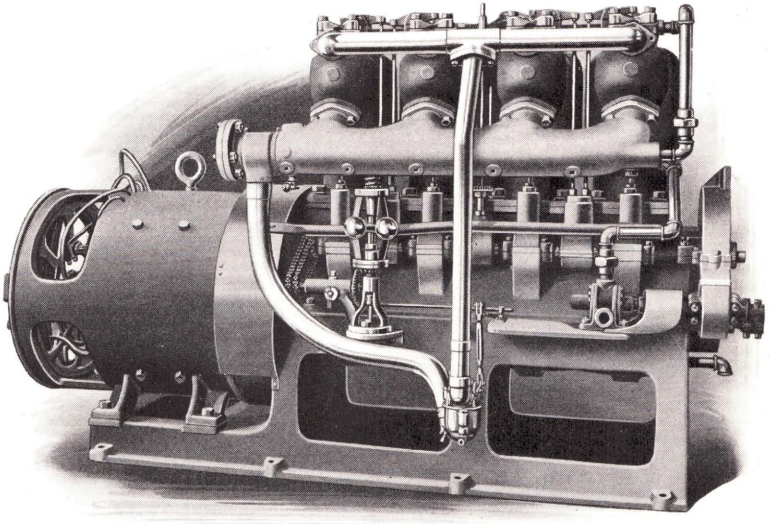
OTHER SEABURY PRODUCTS

Speedway

AUXILIARY AND GENERATING SETS



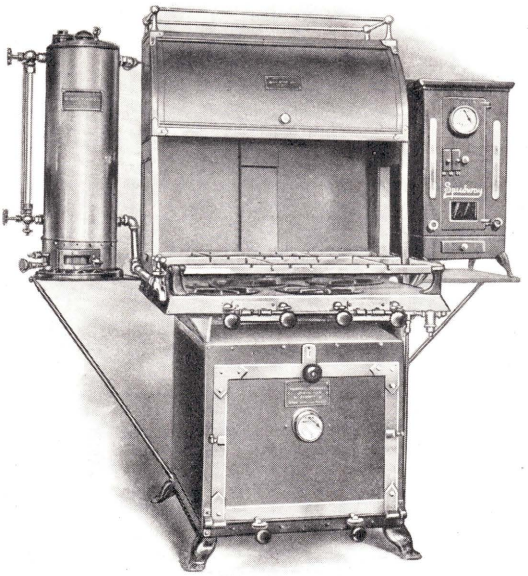
3 and 4 K.W. with Air Compressor and Bilge or Fire Pump



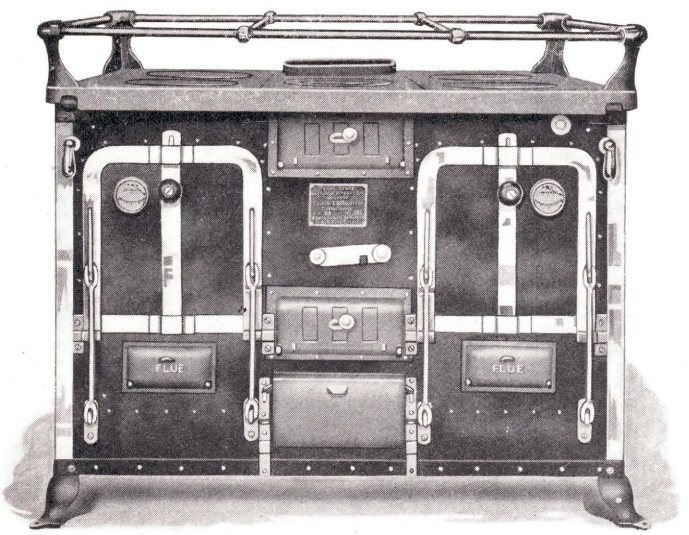
25 K.W. Generating Set

OTHER SEABURY PRODUCTS

Speedway RANGES



Alcohol Range with Water Heater, Broiler and Dish Warmer



Coal Range

BOILER INQUIRY BLANK

GAS ENGINE & POWER COMPANY
AND
CHARLES L. SEABURY & COMPANY
CONSOLIDATED

Morris Heights, New York City

For the convenience of our patrons, there is listed below a memorandum of data desired for the computation of boiler requirements. Fill out as fully as possible, tear off and mail to us, and we will submit a proposition such as will best meet the requirements.

Power Plant for:.....

.....

Type of engine (simple, compound, triple, etc.).....

Number of engines.....

Diameter of cylinders: H.P.....I.P.....L.P.....L.P.....Stroke.....

Point of cut-off.....Steam Pressure.....lbs. Number of R.P.M.....

Natural or forced draft.....Height of stack (if natural draft).....

Kind of fuel (hard or soft coal, wood or oil).....

Grade of fuel (by name, giving B.T.U.'s, if possible).....

If oil fuel, give name of burner used.....

Limitations of boiler space: Length.....Width.....Height.....

Type or name of present boiler.....

Heating surface.....sq. ft. Grate surface.....sq. ft. Casing measurements over all: Length.....Width.....Height (ash pit to top of crown).....

Name of vessel.....Type of vessel.....

Length.....Beam.....Draft.....Speed.....

REMARKS

.....

.....

.....

Name.....

Position.....

Date.....191.... *Address*.....

REDFIELD BROS., INC.
NEW YORK